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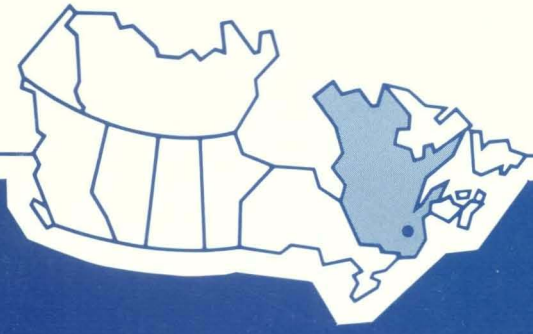
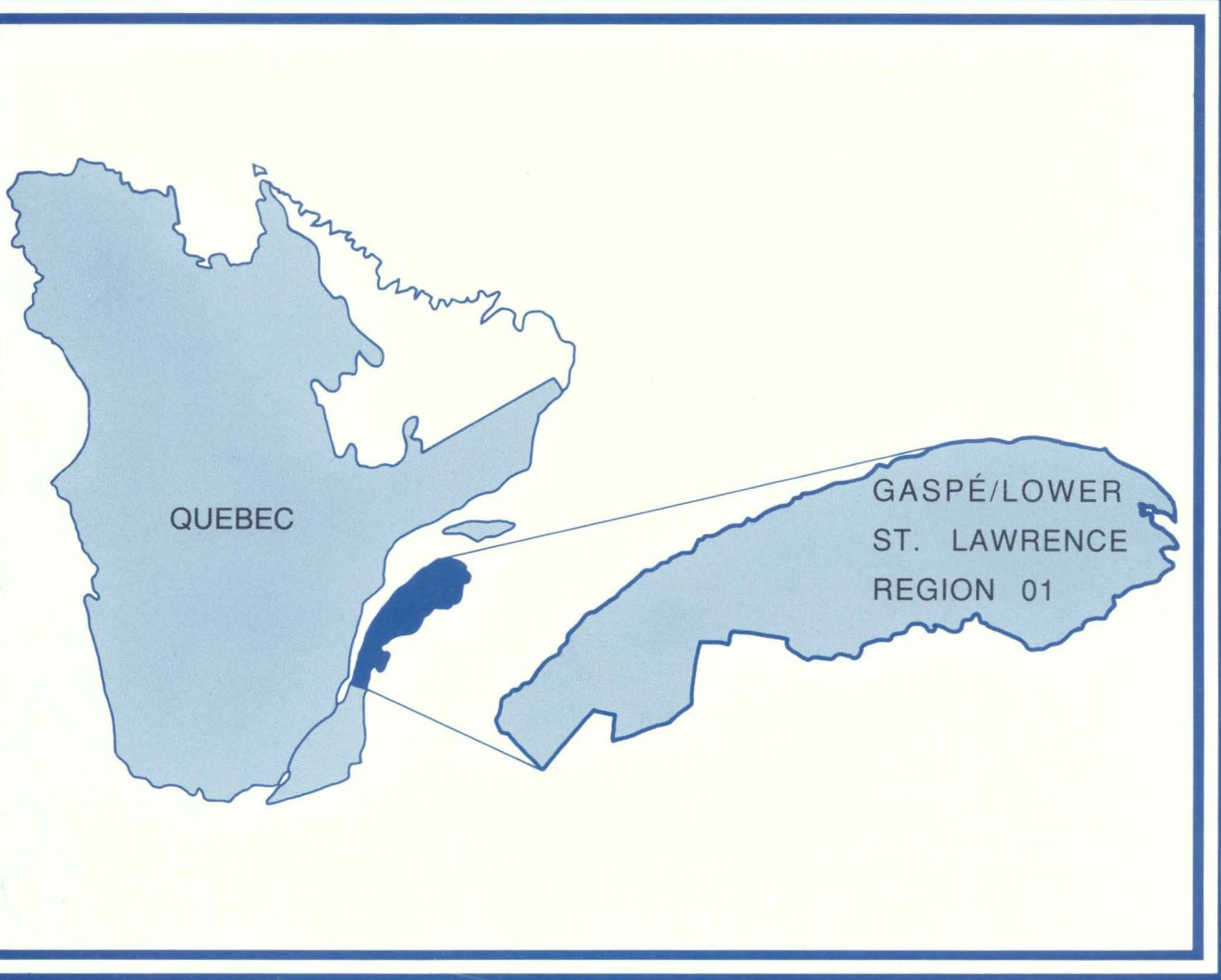
Forest insects and diseases in the Gaspé/Lower St. Lawrence region 1936-1987

Denis Lachance, Claude Monnier, Jean-Pierre Bérubé and René Paquet

Information Report LAU-X-93E
Quebec Region





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ABSTRACT

This is an exhaustive report of the forest insect and disease situation in the years between 1936 and 1987 for Quebec's Adiminstative Region 01. It presents an orderly synthesis of all observations made in the region. This report will enable foresters, researchers, and woodlot owners to better assess the importance of forest pests and the potential danger they represent, and to quickly find complete and precise information on problems that may appear in the region's forests.

The entomological and pathological problems are arranged one after the other in alphabetical order for each tree species, which are also in alphabetical order. There are 13 maps indicating major problems, an alphabetical list of codes, and an index of both Latin and common names of species.

RÉSUMÉ

Ce rapport sur les insectes et les maladies des arbres couvre la région administrative du Bas-Saint-Laurent/Gaspésie (Région 01). Il résulte d'un examen exhaustif de la situation qui prévalait entre 1936 et 1987 et présente de façon ordonnée et synthétisée l'ensemble des observations récoltées dans la région. Ce document permettra aux forestiers, aux chercheurs et aux propriétaires de lots boisés de mieux évaluer l'importance et le danger potentiel que représentent les ravageurs forestiers, et de chercher rapidement une information complète et précise sur les problèmes qui peuvent se présenter dans les forêts de cette région.

Les problèmes entomologiques et pathologiques sont successivement regroupés par ordre alphabétique à l'intérieur des différentes essences, qui sont également présentées par ordre alphabétique. On retrouve de plus 13 cartes de la région qui illustrent les problèmes les plus importants rencontrés, une liste alphabétique des codes des essences et un index des noms communs et scientifiques (latin) des différentes espèces.

INTRODUCTION

The forest has always been of great importance for Quebec; in the early days, the pioneers believed it was inexhaustible. Today, with the heavy demands made on it and the billions of dollars invested and generated as revenue, the forest is a natural resource which we must protect from many scourges. Among these are forest insects and diseases, many of which cause major damage. For example, during the current spruce budworm outbreak, more than 235 million cubic metres of wood has been destroyed in Quebec, resulting in losses that run into the billions of dollars.

In the late 1920s and early 1930s, vast expanses of spruce forest in eastern Canada were ravaged by insects. Reacting to these infestations, the Canadian government organized in 1936 a service known as the Forest Insect Inventory. The province of Quebec followed suit in 1938. Since then, innumerable surveys of both insects and diseases have been carried out in the forests, and the findings have been published in many annual or other reports.

After more than 50 years of forest insect and disease surveys, we believe that historical reports relating the entomological and pathological problems that have existed in the forests in various administrative regions of Quebec would be very useful to all who work in forest management and protection.

This report for the Gaspé/Lower St. Lawrence administrative region will enable foresters, researchers, and woodlot owners to better assess the importance of forest pests and the potential danger they represent, and to quickly find complete and precise information on problems that may appear in the region's forests. The ever-increasing use of trembling aspen and the reforestation of large areas in white spruce are two practices which will no doubt give rise to new protection problems.

This is an exhaustive report of the situation in the years between 1936 and 1987. It presents an orderly synthesis of all observations made in Quebec's Administrative Region 01. Our goal is to give readers an idea of the importance of the major pest organisms and the frequency with which they appear, and also to acquaint them with those that are relatively, or sometimes completely, harmless.

The chief source of data used in preparing this historical document was the data bank of the Forest Insect and Disease Survey unit (FIDS) at the Laurentian Forestry Centre (LFC). This bank has been accumulating data since 1952 when the Forest Biology Division of Agriculture Canada opened an entomology and forest pathology research laboratory in Quebec City.

The chief publication consulted, in which FIDS results were reported, is the *Annual Report of the Forest Insect and Disease Survey*, a national publication first prepared by Agriculture Canada, beginning in 1936, and then by the Canadian Forestry Service from 1960 (note that the Canadian Forestry Service was replaced by Forestry Canada in 1988). From 1938 to 1951, the Government of Quebec Protection Service was the only source of information in Quebec for preparing this annual report. From 1952 to 1965, FIDS-LFC wrote this report with the cooperation of the Quebec Department of Lands and Forests. Subsequently, from 1966 to 1970, FIDS-LFC prepared the national report practically on its own. Since 1971, there has existed a regional annual report - Insectes et maladies des arbres Québec - which was produced at first in cooperation with the Quebec Department of Energy and Resources (DER), but which has been published jointly by FIDS-LFC and the DER's Insect and Disease Protection Service since 1976. This publication is now the chief source of information for preparing the national report.

To add to the historical value of this report and to its intrinsic value as a reference on insects and diseases in the region, we have included, when possible, data published before 1952 in various technical reports as well as other, more recent data that might complement our own.

EXPLANATORY NOTES

Presentation

The information is presented by species in order to facilitate consultation. When a species is secondary or uncommon, it has been included among the generic headings "Other coniferous species" or "Other deciduous species." In the same way, when a reported organism affects several species indiscriminately without showing any noticeable preference, it will be found under one or the other of the above headings, or under "Coniferous and/or deciduous species."

The entomological and pathological problems are arranged one after the other in alphabetical order for each tree species. Depending on the relative importance of a given pest, we have either dealt with it separately, introducing it with a few biological notes or some pertinent information, or else included it with other organisms in a table. Under each pest name in the tables, the years for which no information is given are those for which the data were not significant enough to be mentioned or for which we had no information. Each table is followed by a list of entomological and pathological organisms that have only been reported occasionally in the region or that cause little or no damage. On the other hand, in the case of certain organisms of major importance or special interest, we present maps showing the areas attacked in certain years.

The names of places mentioned in the text are drawn from recent highway maps of the province of Quebec. Place names that appear in brackets "[ ]" are the names of municipalities that do not appear on the highway maps, names that have changed since the time of the survey, or names of municipalities that no longer exist. Lakes and rivers, as well as certain communities, are identified by the census division to which they belong. Sometimes the census division is abbreviated ("CD") or simply placed in parentheses.

Damage assessment

The **damage assessment** terms used frequently in this report generally have the following meanings:

- For problems affecting tree foliage, i.e., insect infestation and defoliation, disease and climatic damage, the **damage assessment levels** are as follows:

> **low or light**: when 10 to 25% of the foliage of the trees or the stand is affected;
> **moderate**: when 26 to 65% of the foliage of the trees or the stand is affected;
> **high, or severe**: when 66% or more of the foliage of the trees or the stand is affected.

- For problems relating to **insect populations**, the **same levels** are used, according to the potential defoliation or damage if their development is not interrupted by a natural cause.

- For problems affecting tree trunks, the damage or infestation **assessment levels** are:

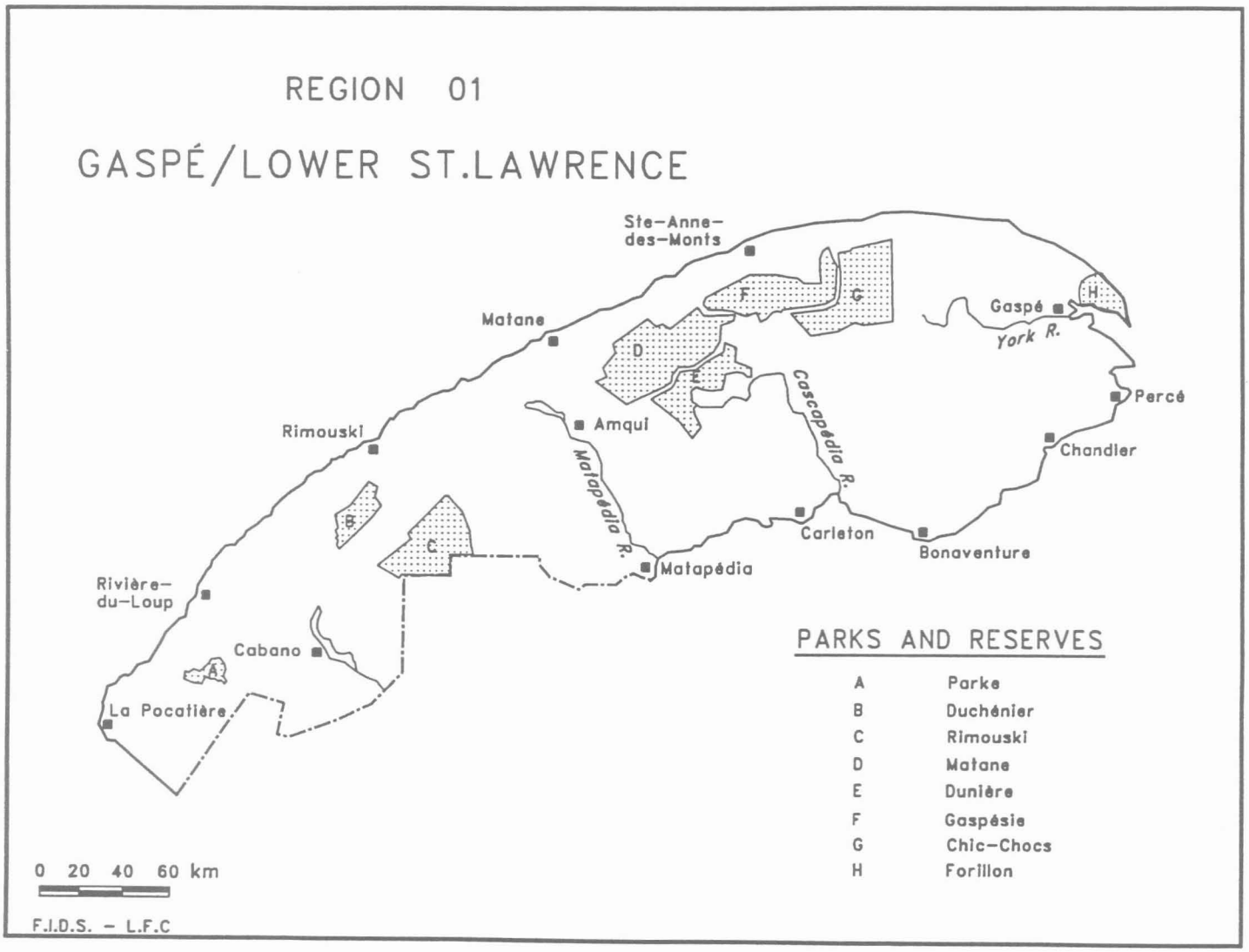
> **low or light**: when 2 to 5% of the trees in a stand are affected;
> **moderate**: when 6 to 25% of the trees in a stand are affected;
> **high, or severe**: when 26% or more of the trees in a stand are affected.

For further information on these damage assessment levels, contact the staff of the FIDS unit at the Laurentian Forestry Centre.

Nomenclature

All names of entities used in this document (municipalities, parishes, wildlife reserves, conservation parks, lakes, rivers, etc.) are drawn from the *Répertoire toponymique du Québec 1987*. In the tables and lists, forest species names are abbreviated, with a few exceptions, in accordance with the codes suggested in *Forest Inventory Terms in Canada*. The abbreviations used appear in the appendix.

Tree names are drawn from *Native Trees of Canada* and insect names from the *Nomenclatura insectorum canadensium*, published by the LFC in 1985. For disease names, we have referred to *Names of plant diseases in Canada* and the *Compendium of plant disease and decay fungi in Canada*. Where these two differ, it is the latter that has been considered as the definitive source.



CONIFEROUS SPECIES

BALSAM FIR

INSECTS

Balsam gall midge, *Paradiplosis tumifex* Gagné

This insect, which produces galls on fir needles, causes no significant damage in forests, but may be harmful in Christmas tree plantations.

Year	Remarks
1941-1946	Occasional collections in Bonaventure CD.
1968	Local damage moderate near L'Anse-à-Valleau, light near Matapédia.
1969	28% of shoots affected locally near Saint-Jean-de-Dieu and about 12% at Saint-Pierre-de-Lamy, Saint-Paul-de-la-Croix, Saint-Jean-de-Dieu, Saint-Médard and Sainte-Irène.
1970-1972	Traces only.
1973	Galls on 50% of shoots, locally between Mont-Saint-Pierre and Mont Jacques-Cartier (Gaspé-Ouest).
1974	Traces.
1975	Light to high levels of damage in seven scattered localities.
1976	Populations affecting 50% of shoots at Saint-Adelme and less than 20% at Cap-Chat and along the Petite Cascapédia River (Bonaventure).
1977	80% of shoots affected at Saint-Damase and 50% at Sainte-Paule, with low population levels at Amqui.

BALSAM FIR

Balsam twig aphid, *Mindarus abietinus* Koch

This aphid, which deforms the new shoots and needles on balsam fir, has no significant effects on the forest. Steps must be taken, however, to control it in Christmas tree plantations.

Year	Remarks
1968-1971	Traces.
1972	Low to high population levels.
1973-1974	Complete collapse of populations.
1975	Low population levels west of the Matane Wildlife Reserve.
1976	Low levels on balsam fir and white spruce at Saint-Damase and northwest of Nouvelle [Dugal].
1977	30% of shoots infested at Chandler and low population levels at Saint-Mathieu, Murdochville, Saint-Jogues, New Richmond, Pabos, and Percé.
1978	General upsurge in populations, varying from low to high levels throughout the region.
1979	Nearly complete collapse of populations except north of Murdochville and at L'Anse-au-Griffon where 40 and 60% of shoots were affected, respectively.

BALSAM FIR

Balsam woolly adelgid, *Adelges piceae* (Ratz.)

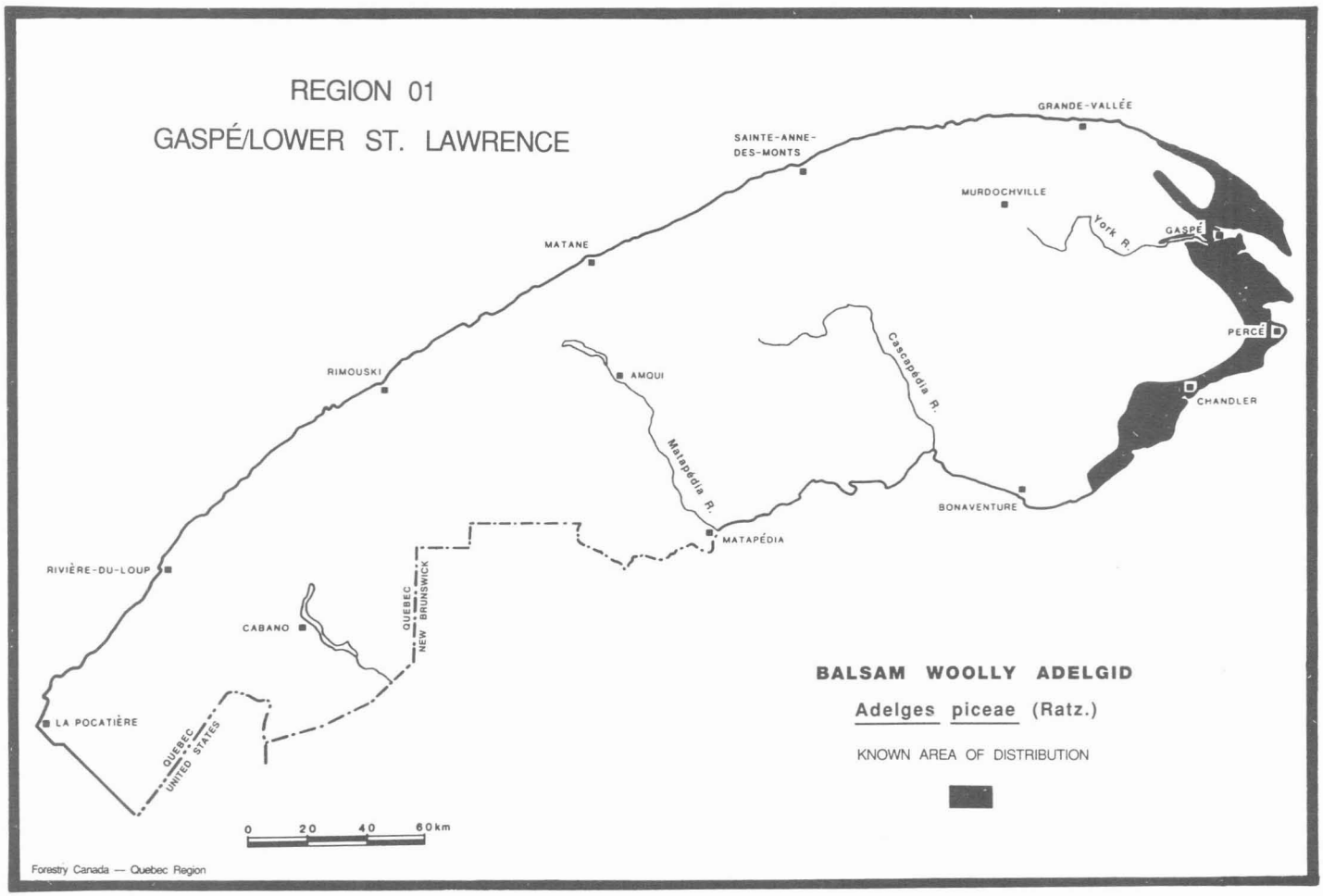
This insect, which was introduced into North America accidentally in the early 1900s, was found at the eastern tip of the Gaspé peninsula in 1964. Following that survey and in subsequent years, more than 2 000 km^2 were declared infested. Fluctuations in population, from all appearances, dated from well before 1964. This insect strikes in two ways, depending on its life cycle. The first and more frequent way consists in attacking the twigs and branches, leading to a deformation of the crown known as "gout" and then, often, to the very slow death of the tree. Its other approach consists in attacking the trunks or stems, which can kill trees more quickly (within a few years). At present, the very low winter temperatures ($\pm$ -30°C) seem to be controlling this species, preventing it from doing more damage where it is already established or from attacking larger areas.

Year	Remarks
1964	First collections made on the Iles de la Madeleine. Discovery of damage and limited mortality on a few trees at Cap-des-Rosiers and at Cap Bon Ami.
1965	Infestation spreading: the largest centers were a few kilometres inland, in the valleys of the Renard, Saint-Jean, and Grand Pabos Ouest rivers (Gaspé-Est) and the Port-Daniel River (Bonaventure). Distribution was in a half-circle measuring about 25 km in radius from Cap-des-Rosiers and another measuring 15 km from Newport, plus a narrow strip between Port-Daniel and Saint-Godefroi.
1966	Expansion of the above two infested zones to a total of nearly 1 500 km^2. In the first zone, the greatest damage was in the basin of the Renard River (Gaspé-Est), at Cap-des-Rosiers, and southeast of Douglastown [L'Anse-à-Brillant]. At the first two sites, crowns of old fir were severely affected, and showing symptoms of gout, without recent reddening but with some occurrence of mortality. This suggested that the infestation had been rampant for 15 years or more. In the second zone, the attacks were severe, particularly in the lower reaches of the basins of the Grand Pabos and Grand Pabos Ouest rivers (Gaspé-Est), and the Port-Daniel River (Bonaventure).
1967	Expansion toward L'Anse-à-Valleau, L'Anse-à-Beaufils, and Petit-Pabos [Colomb], thus uniting the two known zones and bringing the infested area to a total of 2 000 km^2.

BALSAM FIR

1968	Slight expansion west of L'Anse-à-Valleau, increasing the infested area to 2 200 km^2.
1969	Little change; new spot of infestation found 25 km west of Gaspé.
1970	No change.
1971	Slight increase in populations at most permanent collection points; presence of gout in the Port-Daniel Wildlife Reserve.
1972	Increased gout; decrease in attacks on trunks in the area already infested. Slight expansion westward from L'Anse-à-Valleau to Saint-Yvon [Grand-Étang].
1973	Slight expansion west of Port-Daniel and Saint-Godefroi.
1974	Only one new area of infestation detected within the known area of distribution: at Kelly, where the incidence of gout was moderate.
1975	No change in distribution; attacks light on trunks and nil to severe in crowns at various locations.
1976	Expansion along the Dartmouth river, and over 12 km to the west of Saint-Majorique [Cortéréal], with trunks moderately attacked. Fir mortality 8% at Cap-des-Rosiers, 31% at Rivière-au-Renard.
1977	Fresh expansion of the previous zone, to a point 26 km northwest of Saint-Majorique [Cortéréal]. Population active at L'Anse-à-Valleau.
1978	Mortality observed at Cap-des-Rosiers (14%) and Rivière-au-Renard (42%).
1979-1983	Population endemic. See the map of the known area of distribution, page 11.

BALSAM FIR


REGION 01
GASPÉ/LOWER ST. LAWRENCE
GRANDE-VALLÉE
SAINTE-ANNE-DES-MONTS
MURDOCHVILLE
York R.
GASPÉ
MATANE
PERCÉ
Cascapédia R.
AMQUI
RIMOUSKI
CHANDLER
Matapédia R.
BONAVENTURE
MATAPÉDIA
RIVIÈRE-DU-LOUP
QUEBEC
NEW BRUNSWICK
CABANO
LA POCATIÈRE
QUEBEC
UNITED STATES
0 20 40 60km
BALSAM WOOLLY ADELGID
Adelges piceae (Ratz.)
KNOWN AREA OF DISTRIBUTION
Forestry Canada — Quebec Region

BALSAM FIR

Eastern blackheaded budworm, *Acleris variana* (Fern.)

This budworm caused severe damage in certain balsam fir and white spruce stands in the Gaspé Peninsula in 1947 and 1948 when an outbreak killed most of the trees over 25 000 km^2 in the Cascapédia River area (Bonaventure).

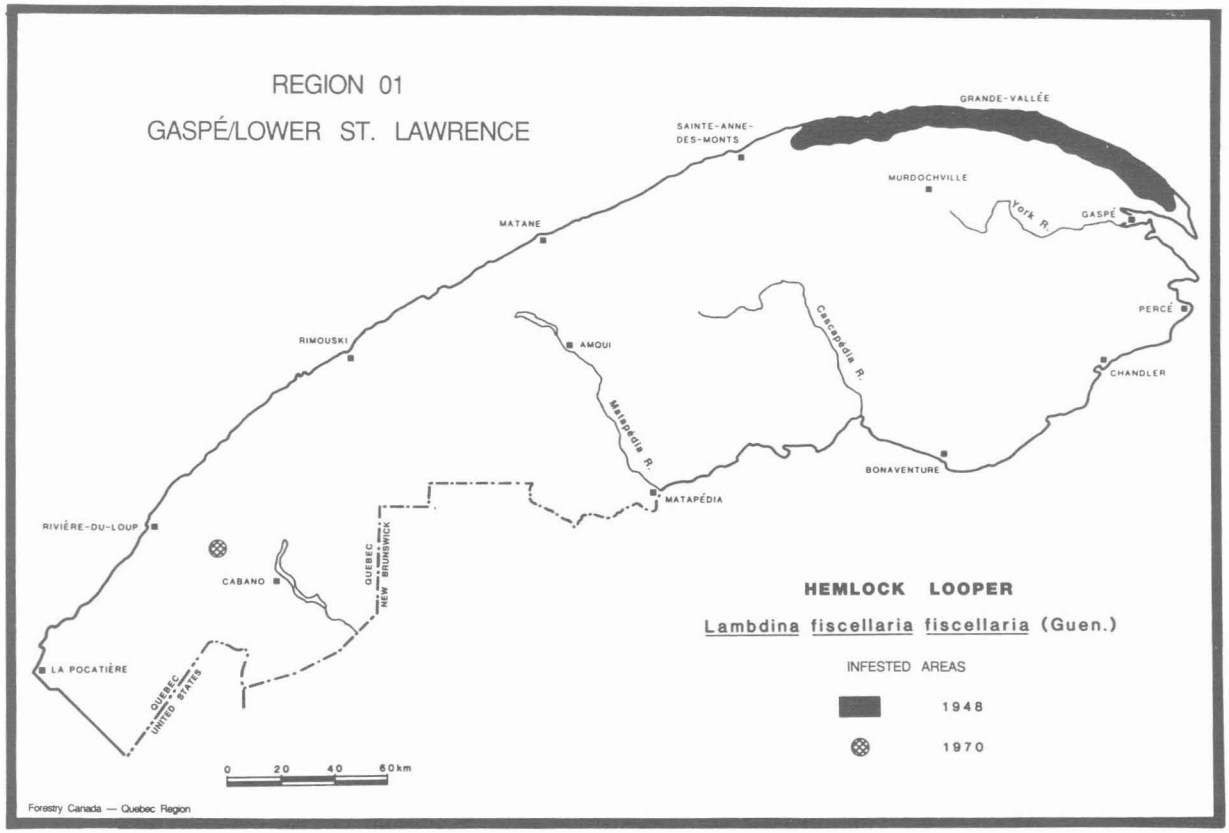
Year	Remarks
1937-1939	Commonly sampled.
1947	Fresh infestation; complete defoliation of annual shoots in certain fir stands in the basin of the Cascapédia River (Bonaventure).
1948	Increase in area and severity of the current infestation, reaching high levels at certain sites in the basins of the Cascapédia, Nouvelle, and Matapédia rivers (Bonaventure); the Malbaie, Saint-Jean, and Grand Pabos rivers (Gaspé-Est); and the Madeleine and Cap-Chat rivers (Gaspé-Ouest).
1949	Considerable decline; only a few sites of moderate infestation persisted in the Matapédia valley.
1952	Slightly more common especially at Grosses-Roches, Causapscal, and Escuminac.
1953	Uncommon.
1954	Localized infestation near the Nouvelle River (Bonaventure).
1957	Large number of collections from Kamouraska, Rivière-du-Loup, and Rimouski CDs. Other smaller concentrations observed in Gaspé-Ouest and Gaspé-Est CDs.
1966-1981	Trace population.

BALSAM FIR

Hemlock looper, *Lambdina fiscellaria fiscellaria* (Gn.)

Through defoliation, this looper can quickly cause tree mortality over wide areas in stands of balsam fir. Its infestations, however, only last for two or three years because of the natural factors that control them.

Year	Remarks
1938	Population endemic: several samples from the Rimouski area.
1940	Balsam fir mortality observed on Ile Bonaventure; possibly caused by this insect three or four years earlier.
1948	Significant damage in old fir stands from Rivière-à-Claude to beyond Rivière-au-Renard (see map below).



BALSAM FIR

1949	Decline in intensity of the previous infestations and drift toward the center of the peninsula: two spots of high-level infection (less than 2.5 km^2 each) in the basin of the York River (Gaspé-Est). Moderate damage near Murdochville and south of Mont Albert (Gaspé-Ouest) and light damage at the head of the Dartmouth River (Gaspé-Est) and in Cabano canton (Témiscouata).
1950	The population decline continued: one small pocket of high-intensity infestation northwest of Gaspé. Levels moderate west of Rivière-au-Renard and east of Saint-Marc-du-Lac-Long [Les Étroits] and low nearly everywhere north of the Gaspé.
1951	The 1948 pocket of infestation nearly disappeared. Population stable.
1952	Epidemic still in regression although certain collections still showed large populations.
1953	Two collections indicate large populations: Bic and Grand Lac Touradi [Touladi] (Rimouski).
1958	Common in the basin of the Grande Vallée River (Gaspé-Est).
1959	Very low population levels in Gaspé-Ouest and Gaspé-Est CDs, the scene of the 1948 outbreak.
1966	Traces.
1967	Slight increase in the number of collections.
1968-1969	Traces only.
1970	Moderate to high levels of infestation over 50 ha in Whitworth canton, Rivière-du-Loup CD (see map, page 13). Population abundant at Grand Lac Squatec (Témiscouata).
1971	Decline of the infestation in Whitworth canton (Rivière-du-Loup).
1972-1978	Endemic.
1979	Unusual flights of butterflies observed at Grand Lac Touradi [Touladi] (Rimouski) over a distance of 8 km in the Duchénier reserve.
1980-1982	Traces.

BALSAM FIR

Reddening of fir

In 1986, several foresters mentioned the presence of numerous reddened fir (Stillwell syndrome) scattered throughout the province. To determine the exact nature of this problem, the Forest Insect and Disease Survey unit of the Laurentian Forestry Centre surveyed 50 balsam fir stands throughout the province and established three study plots.

The results of this research have shown that the reddened fir, in most cases, were located in stands where the trees had experienced stress in recent years, particularly from the **spruce budworm**.

The main cause of the reddening of these fir is "secondary" insects which attack the stressed trees. Chief among these are the **whitespotted sawyer, the balsam fir bark beetle, the conifer ambrosia beetle, the striped ambrosia beetle, the balsam bark weevil,** and the **horntails** - all are xylophagous species that often proliferate in the wake of various scourges which strike the forests.

Galleries made by several of these species were observed on 97% of the reddened fir in the stands surveyed. One disease, **Armillaria root rot**, was also observed on 68% of the trees examined, but in most cases it did not seem to be the main cause of the problem. These data are for all stands surveyed in the province, but they are also valid, except for a few cases, for the Gaspé/Lower St. Lawrence region, where 25 sites were examined.

We anticipate that damage by the above insects and disease will continue in some decadent stands, especially those that have recently been attacked by the **spruce budworm**.

Insects reported:

Whitespotted sawyer, *Monochamus scutellatus* (Say)
Balsam fir bark beetle, *Pityokteines sparsus* (Lec.)
Conifer ambrosia beetle, *Trypodendron rufitarsis* (Kby.)
Striped ambrosia beetle, *Trypodendron lineatum* (Oliv.)
Balsam bark weevil, *Pissodes dubius* Rand.
Horntails, *Sirex* sp.

Fungus reported:

Armillaria root rot, *Armillaria* sp. complex

BALSAM FIR

Rusty tussock moth, *Orgyia antiqua* (L.)

This species was introduced accidentally into North America. Despite its defoliations that especially affect balsam fir and white birch, the damage it causes has never been of great significance in this region.

Year	Remarks
1947	The infestation on the upper Cascapédia River (Bonaventure) continued to spread. Insect present all along Baie des Chaleurs.
1948	Population less abundant.
1967	More common in Rimouski and Bonaventure CDs, but population remained at a low level.
1969-1970	Traces.
1974	Traces.
1975	Population low over 4 km south of Madeleine-Centre (Gaspé-Ouest). Over 21 km of highway near this locality, cocoons abundant in crowns.
1976	Upsurge in populations: nearly 50% of the collections were from balsam fir and white spruce. Zones of moderate to high infestation within 25 km of the river's edge over 285 km^2 between Rivière-à-Claude and Gros-Morne. This zone surrounded by a zone of light infestation over 325 km^2, from Marsoui to Petite-Anse.
1977	Sharp drop in the previous infestation levels; several very local cases of defoliation widely scattered throughout the peninsula; 31% of collections were from conifers and 54% from birch, mainly white birch.

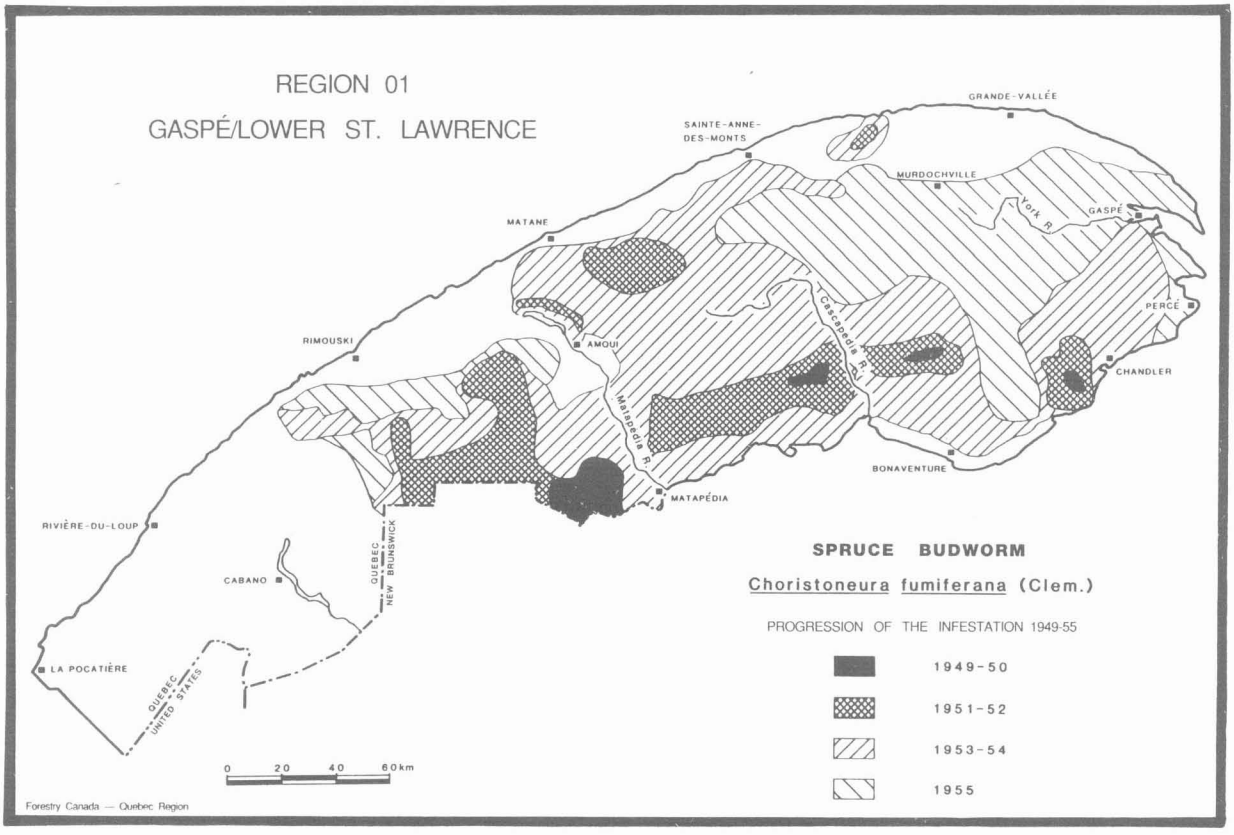
BALSAM FIR

Spruce budworm, *Choristoneura fumiferana* (Clem.)

This indigenous insect is the greatest pest in the forests of eastern North America. It has probably always caused severe defoliation and damage at different times in balsam fir and spruce stands. The populations of this budworm must be monitored constantly to prevent them from reaching an epidemic level.

Year	Remarks
1937	Traces at Bonaventure.
1938	No samples harvested.
1939	Present along the Petit Pabos River (Gaspé-Est).
1942	Local infestation at Chandler.
1946-1947	A few small pockets of low-level infestation scattered here and there.
1948	Isolated areas of moderate infestation in the basins of the Loup River (Rivière-du-Loup), Mitis River (Rimouski), and Cascapédia River (Bonaventure).
1949	Development of several high-level pockets in Kamouraska, Témiscouata, Rimouski, and Matane CDs.
1950	Decrease in populations; defoliation light for the most part, concentrated chiefly between Trois-Pistoles and Causapscal.
1951	Sharp increase in populations: levels of defoliation moderate to high in the Matapédia valley, at Matane, at Rivière-la-Madeleine, in the north of the peninsula, and also at some sites in Kamouraska and Témiscouata CDs.
1952	Further increase, the total infested area exceeding 9 000 km^2. Five major concentrations in the Squatec, Mont-Saint-Pierre, and Bonaventure triangle.
1953	The infestation progressed: defoliation low in Kamouraska, Témiscouata, and Rivière-du-Loup, and generally severe east of these census divisions, except for the spared Gaspé-Ouest region and the northern part of Gaspé-Est. The area affected exceeded 11 000 km^2.
1954	Slight decrease in intensity over the previous year; light defoliation along the coast, more extensive infestation as far as Gaspé-Ouest CD. Baie des Chaleurs remained the most severely affected zone.
1955	The whole region affected at levels varying from low to high (see map, page 18).
1956	Moderate to high levels, especially in the east-central and southern parts of the peninsula. Mortality could be forecast over 180 000 ha (see map, page 18).

BALSAM FIR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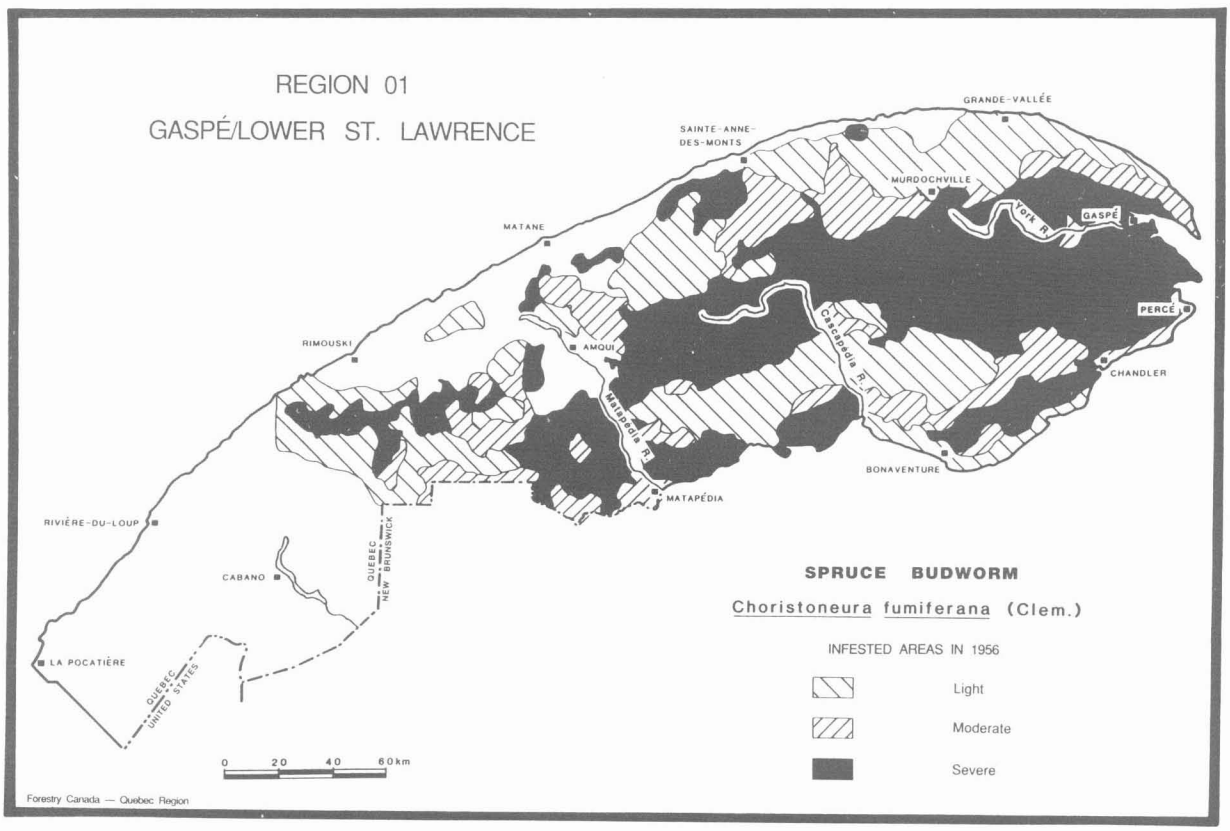
SPRUCE BUDWORM
Choristoneura fumiferana (Clem.)
PROGRESSION OF THE INFESTATION 1949-55
1949-50
1951-52
1953-54
1955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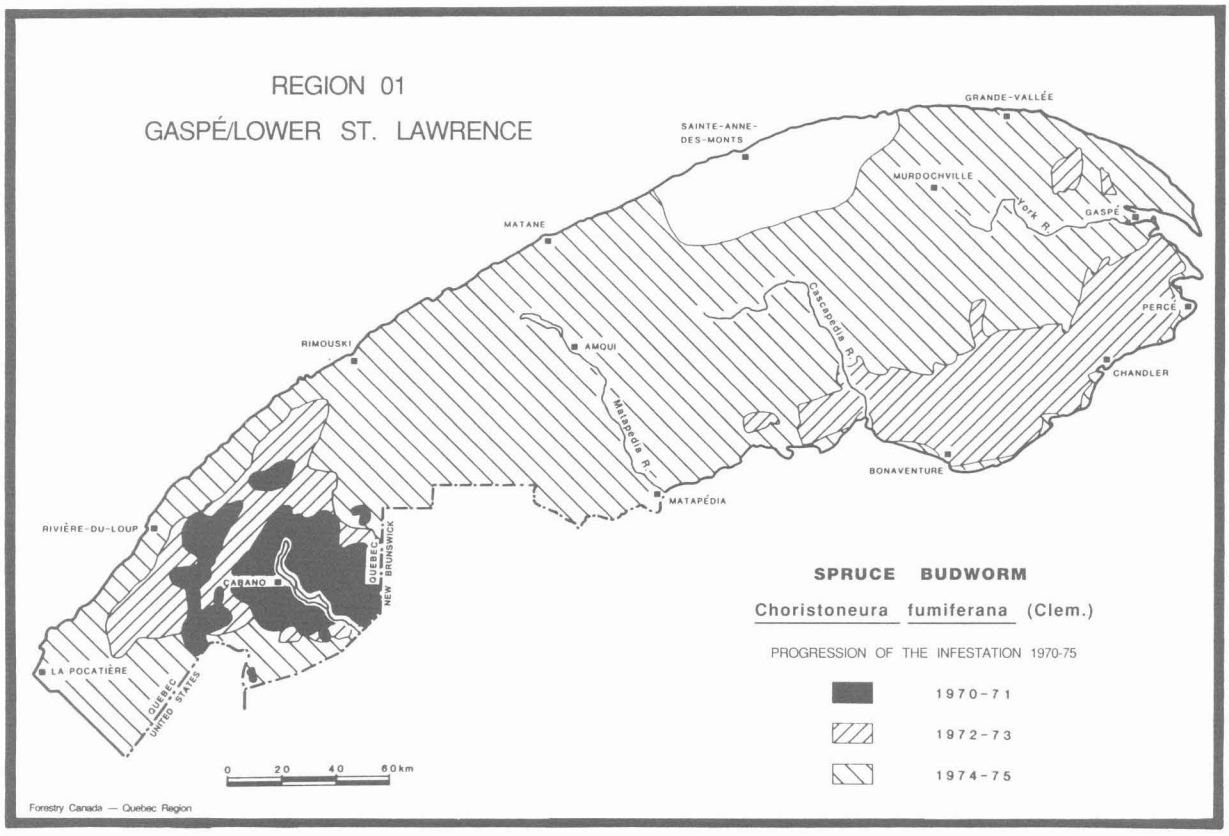
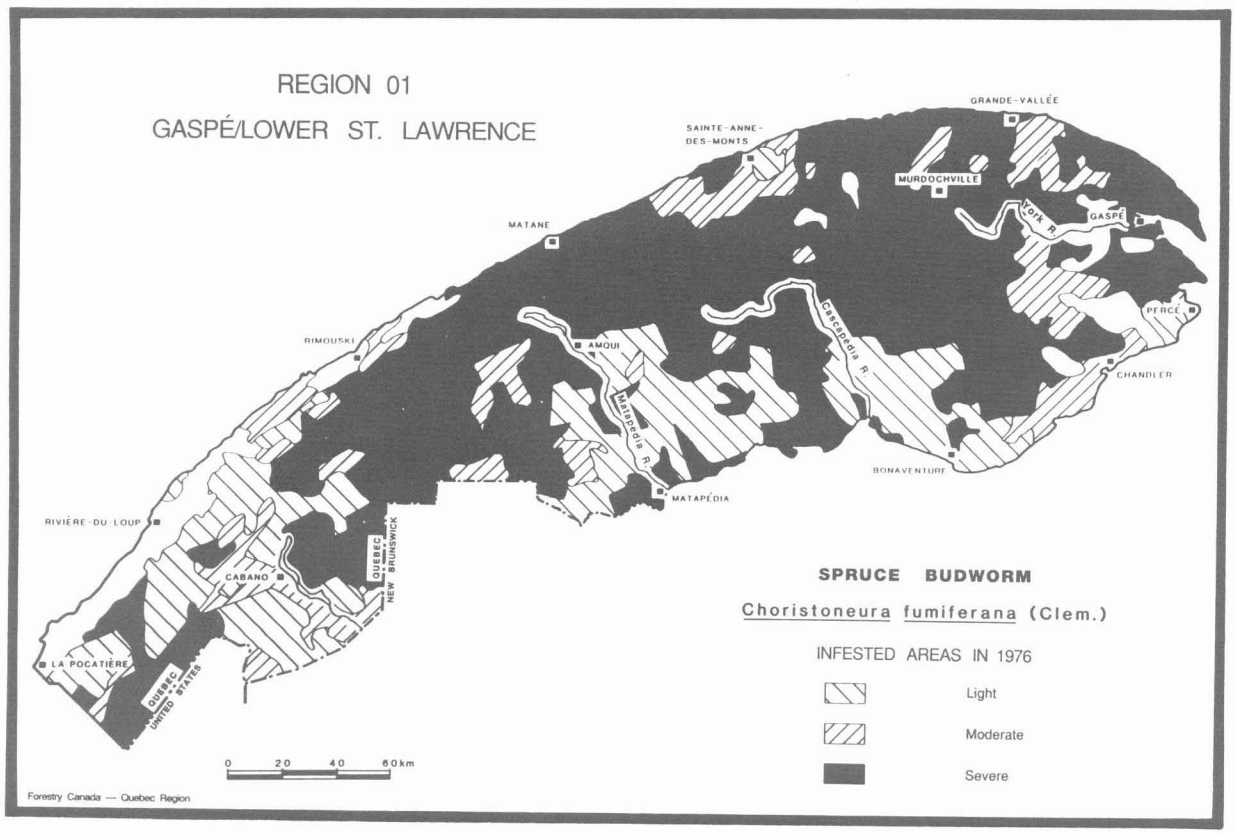
PERCÉ
RIMOUSKI
AMQUI
Cascapédia R.
CHANDLER
Matapédia R.
BONAVENTURE
MATAPÉDIA
RIVIÈRE-DU-LOUP
QUEBEC
NEW BRUNSWICK
CABANO
LA POCATIÈRE
QUEBEC
UNITED STATES
0 20 40 60km
Forestry Canada — Quebec Region
SPRUCE BUDWORM
Choristoneura fumiferana (Clem.)
INFESTED AREAS IN 1956
Light
Moderate
Severe

BALSAM FIR

1957	Population and defoliation generally light in the northern part of the peninsula but higher in the south from Rimouski to Gaspé.
1958	The decrease in populations that began in the previous year continued; concentrations of light defoliation, especially in Rimouski, Bonaventure, and Gaspé-Est CDs.
1959	Infestation over. Residue of low to moderate intensity over 25 km^2 in the upper reaches of the Kedgwick River (Rimouski) and Mistigougèche River (Matapédia).
1960	No defoliation.
1961	A small amount of defoliation near the Patapédia River (Bonaventure).
1962-1963	In regression.
1967	Population increase in Témiscouata and Rimouski CDs.
1968	Occasional presence in Rimouski, Matapédia, Bonaventure, and Gaspé-Est CDs.
1969	Centers of nascent epidemic near Port-Daniel and at Lac Pohénégamook (Kamouraska).
1970	Epidemic proportions over 17 000 ha in the area of Lac Témiscouata (Témiscouata) and Lac Pohénégamook (Kamouraska).
1971	General expansion of the outbreak: 188 000 ha infested, chiefly in Témiscouata CD, with a small amount in the southern part of the peninsula.
1972	Expansion of the outbreak over the major part of the basins of Lac Témiscouata (Témiscouata) and Lac Pohénégamook (Kamouraska), and to the north and northeast in Rivière-du-Loup and Rimouski CDs. Another area of infestation situated south of a line between New Richmond and Saint-Georges-de-Malbaie [Prével]. Total area: nearly 4 000 km^2.
1973	Epidemic still spreading despite the large areas treated. New pockets appeared to be developing slowly in the basin of the York River (Gaspé-Est).
1974	The infestation continued; only the southern part of Rimouski CD and part of Matane and Gaspé-Ouest CDs were relatively unaffected. Fir conditions became critical in certain parts of Bonaventure and Gaspé-Est CDs and the first stages of mortality were visible at the head of Lac Pohénégamook (Kamouraska) and Lac Témiscouata (Témiscouata).
1975	Damage generally moderate to severe over 90% of the territory. Additional mortality in Témiscouata CD and also over 466 km^2 in the basin of the Port-Daniel River, Bonaventure CD (see map, page 20).
1976	Situation similar to 1975, but decreased intensity in areas located in Témiscouata and Bonaventure CDs that had been heavily affected for several years (see map, page 20).

BALSAM FIR


REGION 01
GASPÉ/LOWER ST. LAWRENCE
GRANDE-VALLÉE
SAINTE-ANNE-DES-MONTS
MURDOCHVILLE
York R.
GASPÉ
MATANE
PERCÉ
Cascapédia R.
RIMOUSKI
AMQUI
CHANDLER
Matapédia R.
BONAVENTURE
MATAPÉDIA
RIVIÈRE-DU-LOUP
QUEBEC
NEW BRUNSWICK
CABANO
LA POCATIÈRE
QUEBEC
UNITED STATES
0 20 40 60km
SPRUCE BUDWORM
Choristoneura fumiferana (Clem.)
PROGRESSION OF THE INFESTATION 1970-75
1970-71
1972-73
1974-75
Forestry Canada — Quebec Region


REGION 01
GASPÉ/LOWER ST. LAWRENCE
GRANDE-VALLÉE
SAINTE-ANNE-DES-MONTS
MURDOCHVILLE
York R.
GASPÉ
MATANE
PERCÉ
Cascapédia R.
RIMOUSKI
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CHANDLER
Matapédia R.
BONAVENTURE
MATAPÉDIA
RIVIÈRE-DU-LOUP
QUEBEC
NEW BRUNSWICK
CABANO
LA POCATIÈRE
QUEBEC
UNITED STATES
0 20 40 60km
SPRUCE BUDWORM
Choristoneura fumiferana (Clem.)
INFESTED AREAS IN 1976
Light
Moderate
Severe
Forestry Canada — Quebec Region

BALSAM FIR

1977 80% of the territory still experiencing significant defoliation; the less heavily infested zones varied slightly.

1978 Regression in the center and partly on the north side of the peninsula east of Matane. Little change elsewhere.

1979 The collapse of populations continued in the peninsula, starting from the Matapédia valley although moderate damage remained between the Nouvelle River (Bonaventure) and Gaspé Point. Extensive damage still observed west of the Matapédia River (Bonaventure). Mortality increasing between Rivière-du-Loup and Rimouski and north of Newport.

1980 Spectacular upsurge in the center of the Gaspé, between the Matapédia and Cascapédia rivers (Bonaventure), in the north between Mont-Joli and Cap-Chat, and east of Murdochville. Significant declines in Kamouraska and Témiscouata CDs as far as the Rimouski Wildlife Reserve and along Baie des Chaleurs.

1981 Continuation of the upsurge that began in 1980; damage generally moderate to severe; increased mortality, especially between the Port-Daniel Wildlife Reserve and Forillon National Park.

1982 Significantly renewed outbreak; over 80% of the whole region severely infested. Increased mortality around Lac Mitis (Matapédia), in the basin of the Patapédia River (Bonaventure), between Matane and Amqui, between Gaspé and Anse-Pleureuse, and at certain sites in Kamouraska and Témiscouata CDs.

1983 Decrease in the intensity of defoliation, especially in the central part of the Gaspé. Increased mortality.

1984 Major collapse of the infestation: little defoliation in Témiscouata CD; damage generally light from the Lower St. Lawrence to the center of the Gaspé and rather moderate in the eastern part of the peninsula.

1985 The regression continued: decrease in amount of area infested, with the level of severity generally low. Larger pockets of defoliation persisted in Kamouraska CD, between Rimouski and the Matapédia valley, in the center of the peninsula, between points northwest of Chandler [Pellegrin] and the York River (Gaspé-Est), and finally between Sainte-Anne-des-Monts and Gaspé.

1986 The infestation remained at a moderate level in several areas of the Gaspé Peninsula.

1987 Extension and intensification of the damage, at moderate and high levels, from south of the Rimouski Wildlife Reserve, extending to the south of the Chic-Choc mountains. However, in the northern part of the Gaspé Peninsula as in the eastern tip, there was regression of the insect.

BALSAM FIR

Whitespotted sawyer, *Monochamus scutellatus* (Say)

The damage caused by this borer is especially visible on decadent or stressed trees. For example, in balsam fir stands attacked by the **spruce budworm** there is always a sharp increase in populations of this insect. Also, wood that has been cut from various coniferous species and left for a season or more in the cutting area is often greatly damaged by the insect.

Year	Remarks
1940	Damage present in Gaspé, particularly in Bonaventure CD.
1948	Twig damage by adults observed at the head of the Cascapédia River (Bonaventure).
1967-1969	Traces.
1971	Traces.
1974	Light damage in the basin of the Cascapédia River (Bonaventure).
1976	Presence only.
1977	High incidence of adults and light to moderate damage reported at Lac Témiscouata (Témiscouata) and Lac Mistigougèche (Rimouski).
1978	Observed at several sites in Rivière-du-Loup and Témiscouata CDs.

BALSAM FIR

INSECT	YEAR	HOST	REMARKS
Balsam shootboring sawfly *Pleroneura brunneicornis* Roh.	1973	BF	Population levels low, especially on the Gaspé Peninsula. Damage here and there in the lower part of crowns on 20% of shoots.
	1974	BF	Light damage near Saint-Gabriel (Rimouski).

BALSAM FIR

Partial list of other insects encountered in the region

English name	Latin name	Preferred host(s)
Balsam fir false looper	*Syngrapha rectangula* (Kby.)	BF, TL.
Chameleon caterpillar	*Anomogyna elimata* (Gn.)	BF, WS.
Filament bearer	*Nematocampa limbata* (Haw.)	BF, WS, WB, CON, DEC.
Fir coneworm	*Dioryctria abietivorella* (Grt.)	BF.
Fringed looper	*Campaea perlata* (Gn.)	SM, WB, TL, WS, BF, DEC, CON.
Gray spruce looper	*Caripeta divisata* Wlk.	BF, WS, JP, BS, NS, TL.
November moth	*Epirrita autumnata henshawi* (Swett)	BF, TL,WS, SM, RM, CON, DEC.
Pine looper	*Hypagyrtis piniata* (Pack.)	BF, WS, TL, EWP, RS, JP.
Redlined conifer caterpillar	*Feralia jocosa* (Gn.)	BF, WS, CON.
Redstriped needleworm	*Griselda radicana* Heinr.	WS, S, TL.
Saddleback looper	*Ectropis crepuscularia* (D. & S.)	BF, TL, WS, SM, TA, CON, DEC.
Sawfly	*Acantholyda maculiventris* (Nort.)	BF, WS.
Small conifer looper	*Eupithecia transcanadata* Mack.	WS, BF, BS, NS, TL.
Smoky moth	*Eilema bicolor* (Grt.)	BF, CON.
Spring spruce needle moth	*Archips packardiana* (Fern.)	WS, BF.
Spruce climbing cutworm	*Syngrapha alias* (Ottol.)	WS, BF, BS.
Spruce false looper	*Syngrapha selecta* (Wlk.)	WS, BF.
Transverse banded looper	*Hydriomena divisaria* (Wlk.)	WS, BS, BF, EWP.

BALSAM FIR

Tufted conifer caterpillar	*Panthea acronyctoides* (Wlk.)	BF, WS, BS, JP.
Whitetriangle leafroller	*Clepsis persicana* (Fitch)	WS, BF, CON.

N.B.: Certain species are polyphagous, attacking both coniferous and deciduous trees.

BALSAM FIR

DISEASES

Dermea canker, *Dermea balsamea* (Peck) Seaver
Thyronectria canker, *Thyronectria balsamea* (Cooke & Peck) Seeler

These diseases are of little economic importance, but are relatively common in young fir stands. Small cankers kill the crowns of affected trees. These diseases can be distinguished in the forest by the color of the fungus fructifications: those of *Thyronectria* are red, those of *Dermea* black.

Year	Remarks
1966	Damage observed in the Gaspé Conservation Park over an area of 13 km^2 between Murdochville and Lac Sainte-Anne in which 1 to 3% of the young fir were affected.
1969	Moderate levels observed near the Berry mountains (Matane) and New Richmond; high levels near Gaspé and Lac Sainte-Anne in the Gaspé Conservation Park.
1972	Sudden mortality observed on small groups of fir near Chandler and Grande-Cascapédia and within a radius of 13.0 km around these two centers of infection.
1974	Disease found in several new locations: on the average, 7% of tree crowns were affected.
1975	Moderate levels of infection at Albertville, Saint-Léon-le-Grand, and north of Pointe-à-la-Croix [Mann]; less pronounced attacks in the Matane Wildlife Reserve and in the Gaspé Conservation Park.
1976	*D. balsamea*: light in the Gaspé conservation park at a site 53.0 km southeast of Sainte-Anne-des-Monts. *T. balsamea*: light at Lac Matane, in the Matane Wildlife Reserve, and at a site 14.4 km south of Petite-Vallée.
1982	6% of balsam fir infected over a small area at Padoue (Matapédia).

BALSAM FIR

Needle rust, *Pucciniastrum epilobii* Otth

This disease affects only the needles of the current year. Balsam fir is the common host of this pathogen. White and black spruce are occasional hosts. The infected needles turn yellow and drop prematurely. Fructifications of the fungus (aecia) appear in the spring on the underside of the needles. It is at that time that the disease, which is at times significant, is most readily visible.

Year	Remarks
1961	More than 85% of the needles infected in a large young stand near Chandler. Low to moderate levels of infection in the Gaspé Conservation Park.
1963	Severe infection at Chandler with the rust sometimes affecting nearly all the year's needles.
1975	Lighter and more scattered damage than in 1974. Low-level infection at a site 37 km from Highway 299 on the Square Forks River road (Matapédia) and moderate at Lac Matane (Matane) and at a site 56 km northwest of Saint-Edgar.
1976	Light symptoms 13 km northwest of Escuminac.
1977	Low-level infection west of Murdochville and moderate infection over an area of 1 ha at Pabos.
1978	Low-level infection 24 km northeast of Saint-Edgar.
1980	9% of needles infected on 70% of balsam firs at a site 24 km north of Chandler.

BALSAM FIR

Yellow witches'-broom, *Melampsorella caryophyllacearum* Schroet.

This disease results in the formation of witches' brooms, i.e., the localized proliferation of numerous small, thick twigs in the crowns of balsam fir. It is also found, though rarely, on white and red spruce. The disease is more spectacular than significant.

Year	Remarks
1970	Sampled chiefly in Kamouraska, Témiscouata, Matapédia, and Bonaventure CDs; no significant concentration to report.
1972	About 5% of trees (balsam fir, white spruce, black spruce) affected over small areas of natural forest in Rimouski, Matapédia, and Bonaventure CDs.
1973	Frequently found in Rivière-du-Loup and Bonaventure CDs.
1974	About 21% of trees infected by this disease south of St-René-de-Matane [Rivière-Matane] and 29% at a site 42 km northwest of Grande-Cascapédia; light levels of infection observed at Lac-au-Saumon and high levels at Sainte-Blandine.
1975	Branches of between 1 and 6% of balsam firs attacked here and there throughout the region.
1976	Low levels of infection in Témiscouata CD; sampled frequently throughout the region.
1977	Branches of 9% of balsam fir attacked northeast of Trois-Pistoles; the disease was also detected in Kamouraska and Témiscouata CDs at levels ranging from trace to moderate.
1978	2% increase in the numbers of balsam fir affected since 1974 at a single site located 42 km northwest of Grande-Cascapédia. The mean number of brooms per tree also increased, from 2.0 to 2.3.

BALSAM FIR

ORGANISM	YEAR	HOST	REMARKS
Caliciopsis canker	1974	BF.	Moderate infection over 0.8 ha
Caliciopsis pinea Peck			near New Richmond.
	1977	BF.	Moderate level at Grosses-Roches and light at Lac de Mont-Louis (Gaspé-Ouest).
	1978	BF.	Commonly noted.
Needle rust	1972	BF.	Attacks scattered throughout
Hyalopsora aspidiotus			Gaspé-Est and Gaspé-Ouest CDs.
(Magn.) Magn.	1974	BF.	24 to 75% of foliage infected at Sainte-Florence, Amqui, Sainte-Irène, Murdochville, Grande-Vallée, and Saint-Jules.
Milesia fructuosa Faull	1961	BF.	High level of infection on regeneration at Estcourt.
	1972	BF.	Common on the Gaspé Peninsula.
	1973	BF.	Moderate infections on foliage in the northern part of the peninsula.
Potebniamyces canker	1975	BF.	Between 5 and 10% of trunks
Potebniamyces balsamicola			infected in several stands in
Smerlis			Matane, Matapédia, and Gaspé-Ouest CDs. One high- and one moderate-level outbreak noted in the Matane Wildlife Reserve.
	1976	BF.	Moderate level of infection at Étang à la Truite in the Matane Wildlife Reserve.
	1977	BF.	Low-level infection west of Murdochville.

BALSAM FIR

ORGANISM	YEAR	HOST	REMARKS
Snow blight *Phacidium abietis* (Dearn.) Reid & Cain	1966	BF.	High-level infection on regeneration at Mont Albert (Gaspé-Ouest).
	1969	BF.	Disease abundant in a young stand west of Mann Settlement (Bonaventure).
	1975	BF.	Low infection levels in the Rimouski and Matane Wildlife Reserves.
	1980	BF.	Infection common on the Gaspé Peninsula.
Twig canker *Fusicoccum abietinum* (Hartig) Prill. & Del.	1975	BF.	Moderate infection northwest of Grande-Cascapédia.
	1976	BF.	5% of stems affected near Saint-Alexandre-des-Lacs. Often present elsewhere in the Gaspé Peninsula.

BALSAM FIR

Partial list of other diseases
and pathogenic agents
encountered in the region

English name	Latin name	Preferred host(s)
Aleurodiscus canker	*Aleurodiscus amorphus* (Pers.: Fr.) Schroet.	BF.
Cytospora canker	*Valsa abietis* Fr.	BF.
Nectria dieback	*Nectria fuckeliana* Booth	BF, WS.
Needle cast	*Isthmiella faullii* (Darker) Darker	BF.
Needle cast	*Lirula mirabilis* (Darker) Darker	BF.
Needle cast	*Lirula nervata* (Darker) Darker	BF.
Needle cast	*Phaeocryptopus nudus* (Pk.) Petr.	BF.
Needle rust	*Melampsora abieti-capraearum* Tub.	BF.
Red butt rot	*Inonotus circinatus* (Fr.) Gilbn. (*Polyporus tomentosus* Fr. var. *circinatus* Fr.)	BS, BF.
Scoleconectria dieback	*Scoleconectria cucurbitula* (Tode: Fr.) Booth	RP, JP, EWP, SP, BF.
Twig blight	*Ascocalyx abietis* Naumov	BF.

EASTERN WHITE CEDAR

INSECTS

INSECT	YEAR	HOST	REMARKS
Arborvitae leafminer *Argyresthia thuiella* (Pack.)	1970	EWC.	20% of foliage infested at Mont-Carmel, 35% at Caplan, and 45% at New Richmond.
Cedar leafminer *Argyresthia aureoargentella* Brower	1972	EWC.	Light damage at Sainte-Blandine and Nouvelle.
Cedar leafminer *Argyresthia canadensis* Free.	1969	EWC.	10% of foliage browned near Saint-Fabien.

N.B.: These three species of leafminer were generally present simultaneously in the different centers of infestation listed above, but at different levels.

EASTERN WHITE CEDAR

Partial list of other insects encountered in the region

English name	Latin name	Preferred host(s)
Arborvitae sawfly	*Monoctenus suffusus* (Cress.)	EWC.
Brown cedar leafminer	*Coleotechnites thujaella* (Kft.)	EWC.

EASTERN WHITE CEDAR

DISEASES

ORGANISM	YEAR	HOST	REMARKS
Needle blight *Didymascella thujina* (Durand) Maire	1961	EWC.	Infection on 1 to 5% of the foliage near Chandler and in a stand in the area of Lac Sainte-Anne (Gaspé-Ouest).

PINES

INSECTS

Northern pine weevil, *Pissodes approximatus* Hopk.

Attacks by this weevil generally cause tree mortality. Normally, such attacks occur when the pines are weakened or decadent in plantations.

Year	Remarks
1977	First mention in the region. Attacks on 8% of trunks in a 4-ha plantation north of Lac Matane (Matane).
1978	Increase to 12% at Lac Matane.
1980	Low population levels in a plantation of 250 trees at Cap-Chat.
1983	5% mortality among 500 stems in a plantation at Saint-Noël (Matapédia).

PINES

Northern pitch twig moth, *Petrova albicapitana* (Bsk.)

This insect damages fairly severely young jack pine plantations, causing deformation of the trees. However, it rarely leads to tree mortality.

Year	Remarks
1967	Traces.
1975	Several collections in Kamouraska, Témiscouata, Matapédia, Matane, Bonaventure, and Gaspé-Est CDs.
1976	Population active on 40 and 20% of branches in two plantations in the area of Cap-Seize (Matane) and on 10% at a site 34 km south of Saint-Léon-le-Grand.
1977	50% of branches affected in a 2-ha plantation at Baie-des-Sables (Matane); population levels unchanged south of Saint-Léon-le-Grand (Matapédia).
1978-1979	Traces only.
1980	At Murdochville, attack assessed at 12% of a plantation of 380 000 trees.
1982	Low population levels south of Lac Humqui (Matapédia).

PINES

Pine wood nematode, *Bursaphelenchus xylophilus* (Steiner & Buhrer) Nickle

Nematodes are tiny worms which are found nearly everywhere in the soil and water. Certain species can cause plant diseases and even kill trees. The **pine wood nematode** is generally found on moribund trees, often on trees that have been infested by insects such as the **whitespotted sawyer**, which is thought to be one of its vectors. The **pine wood nematode** especially parasitizes pines, but it may also attack any other coniferous species.

In 1985, after an embargo was imposed by European countries on our exports of logs and chips because of this nematode, Forestry Canada, then the Canadian Forestry Service, organized a special survey of the problem. This survey concentrated on balsam fir, mainly in northern and southeastern Quebec.

In 1986, another survey, dealing especially with pines, was expanded throughout Quebec. Both surveys demonstrated that the **pine wood nematode** is present in two forms in Canada: the so-called "mucronate" form, which is found chiefly on fir trees, and the "round" form, which usually occurs on pine.

The "mucronate" form has been found in several locations scattered throughout the Gaspé/Lower St. Lawrence region while the "round" form has been collected from Scots pine at La Pocatière.

Studies are in progress on insect vectors of this nematode and on its biology in Canada in general.

PINES

INSECT	YEAR	HOST	REMARKS
Jack pine resin midge *Cecidomyia resinicola* (O.S.)	1979	JP.	Low population levels in a plantation near Rivière-du-Loup.
	1980	JP.	Light damage at the same site.
	1982	JP.	Low population levels in a plantation near Cabano.
Jack pine sawfly *Neodiprion pratti banksianae* Roh.	1969	JP.	Low population levels at Saint-André (Kamouraska).
Pine bark adelgid *Pineus strobi* (Htg.)	1975	EWP.	Low population levels near Grande-Vallée.
Pine root collar weevil *Hylobius radicis* Buch.	1969	SP.	Moderate damage at Saint-Alexandre (Kamouraska).
Pine rosette mite *Trisetacus gemmavitians* Styer	1978	RP.	Moderate damage near Saint-Simon.
	1979	RP.	Situation stable at the above site.
Pine tube moth *Argyrotaenia pinatubana* (Kft.)	1978	EWP.	First mention in Administrative Region 01; found on a few ornamental trees at Saint-Valérien.
Redheaded jack pine sawfly *Neodiprion rugifrons* Midd.	1962	JP.	Found at Saint-André (Kamouraska); first collection south of the St. Lawrence.
	1969	JP.	Found near Mont-Carmel.

PINES

INSECT	YEAR	HOST	REMARKS
Swaine jack pine sawfly *Neodiprion swainei* Midd.	1941	JP.	Found in Duquesne canton (Rimouski).
	1984	JP.	Found in six plantations between L'Isle-Verte and Rivière-Bleue.
White pine sawfly *Neodiprion pinetum* (Nort.)	1939	P.	Found in an epidemic state in the seigneury of Bic and in Duquesne canton (Rimouski).
White pine weevil *Pissodes strobi* (Peck)	1949	WS, EWP.	Damage observed east of Rimouski.
	1976	EWP.	Found 32 km west of Gaspé.
	1980	EWP.	About ten saplings attacked by this insect near Sainte-Florence.

PINES

Partial list of other insects encountered in the region

English name	Latin name	Preferred host(s)
Brown pine looper	*Caripeta angustiorata* Wlk.	JP, EWP, RP, SP.
Fir harlequin	*Elaphria versicolor* (Grt.)	WS, CON, JP, RP.
Gray spruce looper	*Caripeta divisata* Wlk.	BF, WS, JP, BS, NS, TL.
Jack pine looper	*Semiothisa bicolorata* (F.)	JP, RP, EWP.
Pine looper	*Hypagyrtis piniata* (Pack.)	BF, WS, TL, EWP, RS, JP.
Red pine sawfly	*Neodiprion n. nanulus* Schedl	JP.
Sawfly	*Neodiprion compar* (Leach)	JP.
Spruce harlequin	*Palthis angulalis* (Hbn.)	WS, JP, TL, CON.
Transverse banded looper	*Hydriomena divisaria* (Wlk.)	WS, BS, BF, EWP.
Tufted conifer caterpillar	*Panthea acronyctoides* (Wlk.)	BF, WS, BS, JP.

PINES

DISEASES

Needle rust, *Coleosporium asterum* (Diet.) Sydow.

This disease especially affects young pines with clusters of two or three needles. The cream-colored fructifications of the fungus appear on infected needles in late spring or early summer. This is the characteristic stage of the disease, leading to early dropping of the infected needles, but apparently having little effect on tree growth.

Year	Remarks
1975	Infection on as many as 10% of needles in a few red pine and jack pine plantations in Matane, Rimouski, and Rivière-du-Loup CDs.
1976	50% of foliage infected on half the jack pines in a 1-ha plantation near Bonaventure.
1977	Level of infection at Bonaventure down by half. Low infection levels also reported in young plantations in Témiscouata CD.
1978	At Bonaventure no change in infection levels.
1981	Moderate damage discovered on 75% of red pine on 3 ha near Nouvelle.
1982	10% of needles infected in a small jack pine plantation at Saint-Alexandre-des-Lacs.

PINES

Scleroderris canker, *Gremmeniella abietina* (Lagerb.) Morelet

This disease is widespread among pines, especially red, Scots, and jack pine. Significant damage can be caused in plantations either through reduced growth or through mortality, especially among stems that are less that 10 years old. Infection generally occurs on the lower branches. Dead terminal buds with their supporting twigs also dead, denuded or, with reddened needles, permit identification of the disease (*G. abietina* races were not differentiated in the above mentioned reports).

Year	Remarks
1968	Low to moderate levels of infection in the red pine and Scots pine plantations in Rimouski CD. Disease also present on red and jack pine near La Pocatière and Rivière-du-Loup.
1970	In the Rivière-du-Loup and Rimouski regions, moderate to high levels of infection on red pine.
1972	Cankers detected on jack pine in a plantation at Saint-Léon-le-Grand and in natural forest in Bonaventure CD. Rimouski CD remains the most heavily affected zone.
1973	A new center of infection detected near Port-Daniel.
1974	New, moderate to high-level infections observed in red pine plantations in Bonaventure CD.
1975	New centers of infection detected on red pine in plantations near Saint-Vianney, Sainte-Paule, southeast of Les Méchins, in the Matane Wildlife Reserve, and at Saint-Marc-du-Lac-Long [Les Étroits].
1976	Progression of the canker noted in plantations at Saint-Alexandre-des-Lacs, north of Lac Matane (Matane), and at Trinité-des-Monts. Natural regeneration recently attacked south of Saint-Léon-le-Grand. In Matane and Matapédia CDs, zones which had been affected for several years, the disease was progressing quickly, infection striking as many as 50% of stems over areas of several hectares each.
1977	To show the speed of development of the disease: a 2-ha red pine plantation at Capucins showed 44% mortality compared to 5% two years before. Southwest of Les Méchins, 92% of jack pine were affected, as compared to only 60% a year

PINES

earlier. At Lac Matane (Matane), the level of infection had risen from 14 to 100% in a single year.

1978 At Capucins, mortality affected 79% of the red pine while at Lac Matane (Matane), it had tripled to 24% of stems. New infected areas were discovered at Sainte-Paule, Saint-Vianney, and Trinité-des-Monts with 100, 76, and 82% of red pine affected and 60, 0, and 8% mortality, respectively. In a plantation of 2 000 trees at the Bonaventure arboretum, 82% of Austrian pine were affected with 49% mortality.

1979 At the Saint-Modeste nursery, 60 000 red pine had to be destroyed because of this disease. In a plantation of 7 000 eight-year-old red pines at Sainte-Paule, mortality affected 56% of stems for a total of 69% of trees affected. As for jack pines in plantations, infections of 17 and 6%, respectively, were observed on 7 000 trees at Saint-Léon-le-Grand and 3 500 trees at Saint-Alexandre-des-Lacs (Matapédia).

1980 Plantations of jack pine affected to a severe degree at Saint-René-de-Matane and to a lesser degree at Causapscal, Lac-Humqui, and Saint-Léon-le-Grand. Also, high infection levels in red pine plantations at Cap-Chat and Sainte-Paule.

1981 A particularly bad year for the young jack pine and red pine plantations. The situation was further aggravated by winter drying. The main infected areas were concentrated in Matapédia, Matane, Bonaventure, and Gaspé-Est CDs.

1982 About half the plantations in Region 01 were infected, generally to a high level. The level of infection rose from 25 to 50% in a plantation of 575 000 jack pine at Saint-Gabriel (Gaspé-Est).

1983 Out of 79 plantations visited, the level of infection was high at 16 sites and moderate at 12. Despite a low percentage of infection (0.1%) in the Sainte-Luce nursery, 300 000 red pine seedlings were destroyed to prevent propagation of the disease.

1984 24% of the plantations inspected were affected to a moderate or high level. The annual rate of infection generally decreased: from 60% in 1983 to 18% in 1984.

1985 The fall in the level of infection seemed to be continuing for the plantations inspected, taken as a group. The mean level of infection was 15%.

1987 Decline in the percentage of infested trees in the moderate to high-level plantations: 6.2% of trees examined in 1987 compared to 13.7% in 1986.

PINES

Western gall rust, *Endocronartium harknessii* (J.P. Moore) Y. Hirat.

This disease is characterized by the presence of round galls on the branches and sometimes on the trunk of jack pine and Scots pine. It leads to reduced growth and occasionally the death of branches. It especially affects seedlings and saplings in plantations and natural forest.

Year	Remarks
1966	Low- to moderate-level infections observed in jack pine plantations at La Pocatière and New Carlisle.
1968	Disease frequent in Kamouraska CD.
1971	Small numbers of recently infected sites in a small jack pine plantation at the Parke Forestry Training Center (FTC).
1973	Disease discovered in a young jack pine plantation near Pabos.
1974	Positive surveys results from jack pine and Scots pine plantations at the Parke FTC and south of Lac Humqui (Matapédia).
1975	At the Parke FTC, moderate level of infection on Scots pine.
1976	A few plantations of Scots pine and jack pine lightly affected at Lac aux Castors (Kamouraska) and at Bonaventure.
1977	In a 1-ha jack pine plantation at Bonaventure, 3% of trunks and 17% of branches were affected.
1978	14% of trunks of lodgepole pine showed evidence of galls in a 0.5-ha plantation at the Matapédia arboretum. Low-level infection in a 1-ha jack pine plantation at Bonaventure.
1979	At the Matapédia arboretum, an infection on lodgepole pine affected 33% of 6 000 trees. Between 7 and 15% of Scots pine affected locally at the Parke FTC. At Bonaventure, infection similar to that observed in 1978.
1980	On lodgepole pine at the Matapédia arboretum, the number of infected trunks increased to 52%. On Scots pine at the Parke FTC, the infection was maintained at between 10 and 15% of the trees.
1981	This rust reported in a jack pine plantation at Saint-Gabriel (Gaspé-Est).
1983	At Bonaventure, the infection increased to the high level in a 1-ha jack pine plantation.

PINES

White pine blister rust, *Cronartium ribicola* J.C. Fischer

This disease, introduced into Canada early in the century, brought the cultivation of white pine to an end. This pathogen infects the needles, spreads along the branch and can reach the trunk where it produces an elongated canker and heavy resinosis. This canker can kill the upper part of the tree. A dead branch with reddened needles is a distinctive symptom of this disease. Wild or cultivated currant and gooseberry bushes (*Ribes* sp.) are an alternate host necessary to propagation of the disease.

Year	Remarks
1966	In a 60-year-old stand covering 0.4 ha at Routhierville, 10 to 15% of trees were affected. In an area of over 1 000 km² in Kamouraska CD, approximately 10% of the young white pine stems between 15 and 20 years in age were infected by this organism.
1973	Expansion eastward: severe damage northeast of Saint-Edgar [Robidoux] and near Saint-Jogues. Low to moderate levels near Mont Berry (Matapédia), southeast of Saint-Yvon [Saint-Hélier] and along the York River (Gaspé-Est).
1974	Moderate to severe damage observed in about ten stands in Bonaventure CD and at two other locations in Gaspé-Ouest CD.
1975	In a plantation west of the Rimouski River and in four stands in Bonaventure CD, moderate to severe infections were detected. One low-level infection was observed at the Parke FTC.
1976	Several outbreaks reported, most often moderate to high levels, near Rimouski, in the basin of the Matapédia River (Bonaventure), north of Saint-Edgar, at Gros-Morne, southwest of Grande-Vallée, and southeast of Saint-Yvon [Saint-Hélier].
1977	In a sample plot at Sainte-Florence, the cumulative number of trees affected was 24%.
1978	4% increase in the number of affected stems noted in the Sainte-Florence sample plot.
1982	10% of trees infected in a stand near the Saint-Jean River (Gaspé-Est).
1986	Low-level infection at a site 5 km north of Lac Fronsac (Gaspé-Est).

PINES

ORGANISM	YEAR	HOST	REMARKS
Cytospora canker *Valsa pini* Alb. & Schw.:Fr.	1980	EWP.	2% of trees affected at Sainte-Florence.
Needle cast *Davisomycella ampla* (J.J. Davis) Darker	1961	JP.	High infection levels in more than 40 ha of stands at the Parke FTC.
Lophodermium pinastri (Schrad.) Chev.	1978	RP.	20% of needles affected at Saint-Louis-du-Ha!Ha!. Also present in the Sainte-Luce nursery.
	1978	SP.	Detected in the Saint-Modeste nursery.
Shoot blight *Sydowia polyspora* (Brev. & Tav.) Mueller	1979	JP.	Low infection in a young plantation of 2 500 stems at Saint-Omer.
Sweetfern blister rust *Cronartium comptoniae* Arthur	1985	JP.	4% of stems affected in a stand in Bonaventure CD, near the Meadow River.
Twig blight *Cenangium abietis* (Pers.) Rehm	1968	P.	Frequent collections on dead branches.

PINES

Partial list of other diseases and pathogenic agents encountered in the region

English name	Latin name	Preferred host(s)
Blue stain	*Ceratocystis minor* (Hedg.) Hunt	SP, WS.
Cenangium dieback	*Cenangium atropurpureum* Cash & Davidson	RP.
Comandra blister rust	*Cronartium comandrae* Peck	JP.
Needle rust	*Coleosporium viburni* Arthur	JP.
Potebniamyces canker	*Potebniamyces coniferarum* (Hahn) Smerlis	SP, TL.
Scoleconectria canker	*Scoleconectria cucurbitula* (Tode: Fr.) Booth	RP, JP, EWP, SP, BF.

SPRUCES

INSECTS

Eastern spruce gall adelgid, *Adelges abietis* (L.)

Although sometimes abundant on regeneration and in certain spruce plantations, the gall adelgid does not cause tree mortality.

Year	Remarks
1939	Appreciable damage reported in the area of Rivière-du-Loup and in Macpès canton (Rimouski).
1940	Significant damage in Macpès canton (Rimouski) and in the seigneury of Pabos.
1941	Presence noted along the Dawson River (Matapédia) and in the cantons of Macpès (Rimouski) and Parke (Kamouraska).
1943	Young spruce affected on the Rimouski-Matane plateaus.
1975	Low to moderate population levels locally on white spruce and black spruce at Cap-Chat and Mont-Louis.
1976	Increase in population at Cap-Chat.
1978	Light damage in a Norway spruce plantation at Cap-Chat. Present on white spruce at the Saint-Modeste nursery.
1982	Present on Norway spruce in the Amqui arboretum.
1983	Low population levels in a white spruce plantation near Saint-Marc-du-Lac-Long [Les Étroits] (Témiscouata).

SPRUCES

European spruce sawfly, *Gilpinia hercyniae* (Htg.)

This insect, which was introduced into Canada accidently, began its ravages in the Gaspé about 1930 and caused mortality in many spruce stands until about 1940. According to Martineau (1985), 11 million cubic metres of wood were destroyed at that time. Fortunately, a viral disease that appeared around 1938 seems to be controlling this sawfly at present.

As a result of the **spruce beetle** infestation, which also devastated spruce stands around the same period, the composition of the Gaspé forest was greatly modified; in 1938 it was estimated that 34% of the total volume in the region had consisted of spruce stands and that 65% of that volume had been destroyed by these insects.

Year	Remarks
1930	Significant depredation in the interior of the Gaspé Peninsula.
1933-1934	Destruction of old foliage on young black spruce (7 m high) near Lac Sainte-Anne (Gaspé-Ouest).
1936	Present and abundant throughout the territory.
1937	The population levels and distribution of the insect were on the increase. According to a special survey, losses of wood due to spruce mortality amounted to 4.6 million cubic metres.
1938	Pronounced defoliation throughout the territory although there was a slight decline in larval populations at some sites; on the whole, though, the number of dead trees was increasing.
1939	General infestation at its peak (see map, page 50). Many dying or heavily defoliated spruce in the south-central part of the Gaspé (New Richmond, Paspébiac River, Murdochville) where the epidemic seems to have originated.
1940	Considerable decrease in the epidemic, with a viral disease causing ever-increasing larval mortality. Infestation, however, remained high at several sites throughout the territory.
1941	Infestation estimated to be only one-fourth as intense as in 1939. Viral disease present throughout the infested area. Relatively low defoliation levels.
1942-1945	Appreciable and gradual decline in populations. A few spots of moderate defoliation still observed.
1946	Presence noted.
1947	No report.

SPRUCES

1948 Light defoliation in the center of the Matapédia valley and along the Cascapédia River (Bonaventure).

1953 Disappearance of the pockets in the Matapédia valley and the seigneury of Mitis (Matane). A single sample at Biencourt [La Nativité].

1957 Low populations in the CDs of Gaspé-Est and Gaspé-Ouest.

1971 Presence noted.

1972 Insect common but populations low in the Gaspé.

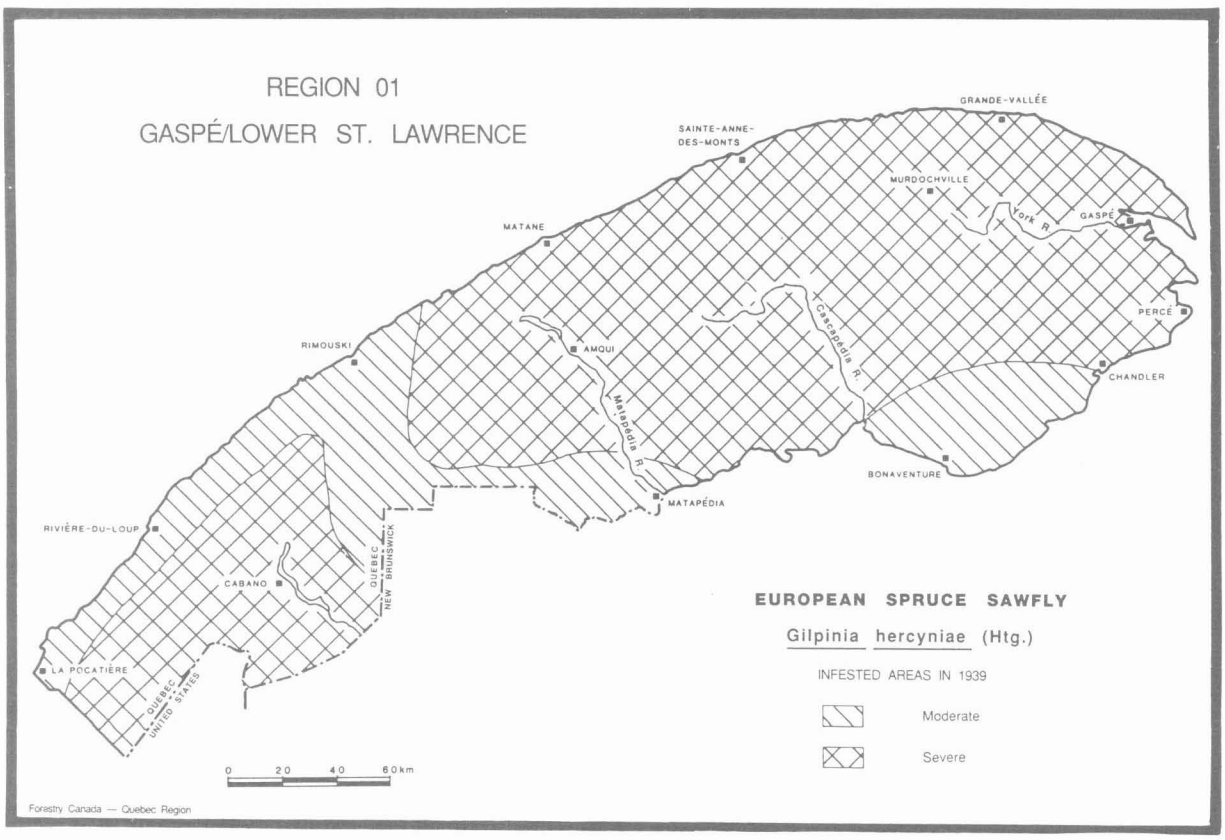
1974-1975 Low population levels reported throughout the territory.

1978 Low levels in a white spruce plantation at Saint-Léon-le-Grand (Matapédia).

1981 Population increasing slightly here and there in the territory.

1982 Large increase in an 8-ha white spruce plantation north of Saint-Omer [Biron] and moderate increase in 3- and 4-ha plantations at Cap-Seize (Gaspé-Ouest).

1983 Increase in the population at Cap-Seize. Moderate level reported in a plantation at Saint-Alphonse (Bonaventure).



SPRUCES

Spruce beetle, *Dendroctonus rufipennis* (Kby.)

It is often said that this indigenous insect is a secondary one because at the start of its infestations it takes advantage of spruces that are decadent or stressed by other causes - infestation by other insects, windthrow, etc. - to increase its populations. Subsequently, it also attacks healthy trees in infested and neighboring stands and can cause great damage over wide areas. The only effective means of control known consists in cutting and recovering affected trees as soon as damage appears in the stand.

Year	Remarks
1887-1901	Outbreak reported in the basins of the Dartmouth and York rivers (Gaspé-Est).
1915-1921	Infestations following windthrow reported in the basins of the Dartmouth, Saint-Jean, and York rivers (Gaspé-Est).
1928-1934	A more severe infestation than previous ones, east of the Matapédia valley; the most severe damage was observed in the basins of the Cascapédia River (Bonaventure), the Marsoui River (Gaspé-Ouest), and the York River (Gaspé-Est). Wood losses were assessed at 18 million cubic metres.
1937	A summary inventory in the northern part of the Gaspé Peninsula, including the basins of the Matane (Matane), Cap-Chat, Sainte-Anne, Mont-Louis, Madeleine (Gaspé-Ouest), Grande Vallée, and Dartmouth rivers (Gaspé-Est) showed that spruce mortality amounted to 15.3 cubic metres, suggesting that wood losses for the Gaspé Peninsula as a whole exceeded the 1934 assessment of 18 million cubic metres.
1938	Mortality reported at Lac Mitis (Matapédia).
1940	Moderate infestation reported in Rimouski CD.
1941	Occasional insect collection.

SPRUCES

Spruce budmoth, *Zeiraphera canadensis* Mut. & Free.

This budmoth may cause severe damage, especially in white spruce plantations, but it also attacks other spruces.

Year	Remarks
1960	Very common in the Gaspé peninsula.
1967	General increase in populations in the territory.
1969	Low to moderate incidence in the Gaspé/Lower St. Lawrence region.
1974	Light local infestations in Rivière-du-Loup, Rimouski, and Matapédia CDs.
1977	Low population levels at Saint-Moïse, moderate levels at Sainte-Angèle-de-Mérici (Rimouski).
1979	Population levels high at Maria, moderate at Grande-Rivière.
1985	Increase in populations in white spruce plantations. Severe damage at Caplan, Saint-Alexis-de-Matapédia, Saint-François-d'Assise, Price, Lots-Renversés, Saint-Narcisse-de-Rimouski, and Trinité-des-Monts.
1986	Severe damage at Saint-Jean-de-Matapédia and north of the Josué lakes (Matapédia).
1987	Populations high north of the Josué lakes (Matapédia) and moderate at Murdochville, Saint-Siméon, Saint-Alphonse, Sainte-Paule, and Saint-François-d'Assise.

SPRUCES

Spruce budworm, *Choristoneura fumiferana* (Clem.)

Although this insect has a preference for balsam fir, white and red spruce are also preferred hosts. In severe infestations, mortality among spruces is lower, but defoliation is nevertheless high. See **balsam fir**, pages 18 and 20.

SPRUCES

Spruce coneworm, *Dioryctria reniculelloides* **Mut. & Mun.**

This coneworm sometimes causes severe defoliation on balsam fir and spruce and also damages cones. It is often associated with the **spruce budworm**.

Year	Remarks
1947	Severe infestation over a very limited area near Lac Témiscouata (Témiscouata). By the next year, the insect had disappeared.
1949	Abundant along the Matane River (Matane).
1950	Abundant along the river, Rimouski and Matane CDs. Associated with a **spruce budworm** outbreak.
1956	Present in Rimouski, Matapédia, and Matane CDs.
1975	High population levels over 2 ha at Saint-Valérien (Rimouski).
1976	Associated with a **spruce budworm** outbreak. Upsurge in populations in Rimouski, Matapédia, and Matane CDs. Present at Barachois and Maria.
1977	Frequent on white spruce in Rimouski and Matapédia CDs. Moderate to high population levels near Bic, Saint-Valérien, Saint-Moïse, and Saint-Damase.
1978	Frequent in the Gaspé peninsula. Associated with a **spruce budworm** outbreak. High population levels at Baie-des-Sables and Saint-Valérien.
1979	Moderate population levels at Saint-Valérien.
1980	Population on the increase; high levels at Saint-Valérien. No other report on the insect since this time.

SPRUCES

Yellowheaded spruce sawfly, *Pikonema alaskensis* (Roh.)

This sawfly can cause mortality in spruce that are in regeneration or in plantations.

Year	Remarks
1933-1934	Near Lac Sainte-Anne (Gaspé-Ouest), this sawfly caused mortality of young black spruce (7 m tall) which had already been ravaged by the **European spruce sawfly.**
1936	Presence noted throughout the territory.
1938	Samples harvested north of Chandler [Saint-Edmond-de-Pabos] and Saint-Alexandre (Kamouraska).
1940	Moderate defoliation reported at three locations in Gaspé-Est CD: seigneury of Pabos, Rivière-au-Renard [Fox], and Wakeham [Sunny Bank].
1941	Defoliation noted in the cantons of Duquesne (Rimouski), Parke (Kamouraska), Causapscal (Matapédia), and Fox (Gaspé-Est).
1942	Local defoliation in Rimouski and Bonaventure CDs.
1943	Defoliation reported in the eastern part of Bonaventure CD.
1945	Significant defoliation of young spruce in the eastern part of Bonaventure CD.
1947	Major defoliation reported in Bonaventure CD.
1951	Significant defoliation of young spruce along the York River (Gaspé-Est) and at Les Méchins (Matane).
1953	A single collection, from Lac Mitis (Matapédia).
1974	40 to 90% defoliation of young white spruce in a plantation at Saint-Léon-le-Grand (Matapédia).
1975	Moderate to severe defoliation reported in five plantations in Matane and Matapédia CDs and in a natural forest near Sainte-Irène (Matapédia).
1976	Moderate to severe defoliation in several localities in Matapédia and Matane CDs. In particular, severe defoliation at Saint-Adelme, Saint-Alexandre-des-Lacs, and Sainte-Paule [Sainte-Paula] and light defoliation at Saint-René-de-Matane [Ruisseau-Gagnon] and Saint-Léon-le-Grand.
1977	Sharp drop in populations. A single plantation (2 ha) reported with a low level at Saint-Adelme (Matane) where 15% of the trees had died as a result of repeated defoliation.

SPRUCES

1978	Light defoliation in a plantation of white spruce at Cap-Seize [Saint-Bernard-des-Lacs].
1979	Presence only reported in the Gaspé.

SPRUCES

INSECT	YEAR	HOST	REMARKS
Balsam fir sawfly *Neodiprion abietis* (Harr.)	1941	S, BF.	Light defoliation in Matapédia CD and along the Matane and Nouvelle rivers (Bonaventure)
	1948	S, BF.	Light defoliation in the basin of the Cascapédia River (Bonaventure).
	1975	BS.	Low population levels northeast of Causapscal.
Greenheaded spruce sawfly *Pikonema dimmockii* (Cress.)	1938	S.	Commonly encountered on this species.
	1972	WS, BS.	Low population levels throughout Administrative Region 01.
Owen larch looper *Semiothisa oweni* (Swett)	1977	BS.	Low populations south of Saint-Léon-le-Grand.
Pine leaf adelgid *Pineus pinifoliae* (Fitch)	1976	WS.	30% of shoots infested in a plantation near Cap-Seize.
Pine needle scale *Chionaspis pinifoliae* (Fitch)	1970	WS.	Moderate population levels on a few trees at Saint-Joseph-de-Kamouraska.
	1972	WS.	Moderate population levels on about twenty trees at Saint-Valérien (Rimouski).
Ragged sprucegall adelgid *Pineus similis* (Gill.)	1978	WS.	Light damage in a plantation near Cap-Seize.

SPRUCES

INSECT	YEAR	HOST	REMARKS
Spruce-fir looper *Semiothisa signaria dispuncta* (Wlk.)	1957	S, BF, TL.	One concentration observed in the Lower St. Lawrence, near Saint-Honoré (Témiscouata).
	1977	WS.	Low populations at Saint-Fidèle-de-Restigouche.
		BS.	Low populations southwest of Lac Humqui (Matapédia).
Strawberry root weevil *Otiorynchus ovatus* (L.)	1941	S.	Adults observed on foliage in Macpès canton (Rimouski).
	1984	WS,	1% of seedlings infested at the Sainte-Luce nursery.
	1985	S.	Light damage at the Sainte-Luce nursery.
Yellow spruce budworm *Zeiraphera fortunana* (Kft.)	1960	WS.	Low to moderate local levels of infestation in the Gaspé/Lower St. Lawrence region, especially along Baie des Chaleurs.
	1977	WS.	Low population levels at Saint-Moïse and Saint-Valérien.

SPRUCES

Partial list of other insects encountered in the region

ENGLISH NAME	LATIN NAME	PREFERRED HOST(S)
Chameleon caterpillar	*Anomogyna elimata* (Gn.)	BF, WS.
Cooley spruce gall adelgid	*Adelges cooleyi* (Gill.)	WS, BS, S.
European spruce needleminer	*Epinotia nanana* (Treit.)	WS.
Filament bearer	*Nematocampa limbata* (Haw.)	BF, WS, WB,CON, DEC.
Fir harlequin	*Elaphria versicolor* (Grt.)	WS, CON, JP, RP.
Fringed looper	*Campaea perlata* (Gn.)	SM, WB, TL, WS, BF, DEC, CON.
Gray spruce looper	*Caripeta divisata* Wlk.	BF, WS, JP, BS, NS, TL.
Needle miner	*Coleotechnites atrupictella* (Dietz.)	WS, CON.
November moth	*Epirrita autumnata henshawi* (Swett)	BF, TL, WS, SM, MOM, RM, CON, DEC.
Orange spruce needleminer	*Coleotechnites piceaella* (Kft.)	S.
Pine looper	*Hypagyrtis piniata* (Pack.)	BF, WS, TL, EWP, RS, JP.
Purplestriped shootworm	*Zeiraphera unfortunana* Powell	S.
Redlined conifer caterpillar	*Feralia jocosa* (Gn.)	BF, WS,CON.
Redstriped needleworm	*Griselda radicana* Heinr.	WS, S, BF,TL.
Saddleback looper	*Ectropis crepuscularia* (D. & S.)	BF, TL, WS, SM, TA, CON, DEC.
Sawfly	*Acantholyda maculiventris* (Nort.)	BF, WS.
Small conifer looper	*Eupithecia transcanadata* Mack.	WS, BF, BS, NS, TL.
Spring spruce needle moth	*Archips packardiana* (Fern.)	WS, BF.

SPRUCES

Spruce climbing cutworm	*Syngrapha alias* (Ottol.)	WS, BF, BS.
Spruce false looper	*Syngrapha selecta* (Wlk.)	WS, BF.
Spruce harlequin	*Palthis angulalis* (Hbn.)	WS, JP, TL, CON.
Transverse banded looper	*Hydriomena divisaria* (Wlk.)	WS, BS, BF, EWP.
Tufted conifer caterpillar	*Panthea acronyctoides* (Wlk.)	BF, WS, BS, JP.
Whitetriangle leafroller	*Clepsis persicana* (Fitch)	WS, BF,CON.

N.B.: Certain species are polyphagous, attacking both coniferous and deciduous trees.

SPRUCES

DISEASES

Needle rust, *Chrysomyxa ledi* (Alb. & Schw) de Bary var. *ledi* and *Chrysomyxa ledicola* Lagerh.

This disease of the current year's needles affects black, white, and even red spruce. It especially affects young trees and the lower branches of older trees, chiefly those growing near bogs and clearings. The disease is found throughout the region. These two rusts are impossible to differentiate in the field and often occur on the same tree.

Year	Remarks
1961	Reported chiefly on black spruce at New Richmond and Saint-Alexandre and along the Matapédia River (Matapédia, Bonaventure).
1964	Reported on black spruce at several sites on the peninsula with a few infestations affecting 90% of the needles.
1969	Infections noted at Saint-Bruno-de-Kamouraska and Albertville.
1970	Moderate intensity on black spruce southeast of Saint-Gabriel-Lalemant [Saint-Gabriel-de-Kamouraska].
1972	Observed over nearly 5 ha in a white spruce stand at Cap-des-Rosiers.
1974	Several centers of low to moderate infection on white and black spruce throughout the territory; 75% of black spruce foliage affected at Saint-Ulric (Matane).
1975	Light to moderate damage on black spruce between Rivière-du-Loup and Murdochville.
1976	Found on 10% of black spruce needles east of Murdochville.
1977	Moderate damage observed on black spruce near Saint-André, Saint-Alexandre, Rivière-du-Loup, and Cabano. Light damage also found at several sites in Témiscouata CD and over 2 ha at Pointe-au-Père and 1 ha at Saint-Jean-de-Cherbourg (Matane).
1978	The most significant damage was reported near Saint-Arsène and Causapscal. Other lighter damage, covering 1 to 8 ha, observed at Bonaventure, Saint-Elzéar (Bonaventure), Saint-Alexandre-des-Lacs, Lac-Humqui, Mont-Louis, Murdochville, and La Rédemption.

SPRUCES

1979	Moderate infections over 10 ha to northeast of Causapscal and locally south of Cabano. Other low-level infections over less than 5 ha were found near the Parke Forestry Training Center and at Saint-Alexandre, Cacouna, Murdochville, Luceville, and Sayabec.
1980	Low to moderate infections on white and black spruce scattered throughout the region; 75% of black spruce foliage affected at Saint-Ulric.
1981 +	Disease no longer monitored systematically from this date.

SPRUCES

ORGANISM	YEAR	HOST	REMARKS
Cone rust	1966	WS.	High level of infection locally at
Chrysomyxa pirolata Wint.			New Carlisle.
	1984	WS.	Traces of infection, but occurring frequently.
Red butt rot	1967	WS.	Centers of infection in plantations
Inonotus tomentosus (Fr.)			at the Parke Forestry Training
Gilbn. (*Polyporus*			Center and in natural forest at
tomentosus Fr.)			Routhierville (Matapédia).
		BS.	Infection at La Pocatière.
	1973	BS.	Mortality reported locally at Penouille (Gaspé-Est).
Snow blight	1978		Generally low infections in
Lophophacidium hyperboreum			the nurseries at:
Lagerb.		NS.	Paspébiac,
		WS.	Saint-Modeste,
		WS, RS.	Sainte-Luce.
	1981	S.	Light damage in the nurseries at Saint-Modeste and Sainte-Luce.
Yellow witches'-broom	1974	BS.	Traces of infection scattered
Chrysomyxa arctostaphyli Diet.			throughout Gaspé-Est CD.

SPRUCES

Partial list of other diseases and pathogenic agents encountered in the region

ENGLISH NAME	LATIN NAME	PREFERRED HOST(S)
Blue stain	*Ceratocystis minor* (Hedgc.) Hunt	SP, WS.
Cytospora canker	*Cytospora kunzei* Sacc.	WS.
Nectria dieback	*Nectria fuckeliana* Booth	BF, WS.
Needle rust	*Chrysomyxa weirii* Jacks.	BS.
Red butt rot	*Inonotus circinatus* (Fr.) Gilbn. (*Polyporus tomentosus* Fr. var. *circinatus*)	BS, BF.
Tip blight	*Sirococcus strobilinus* Preuss	WS.
Tryblidiopsis dieback	*Tryblidiopsis pinastri* (Fr.) Karst.	BS.

TAMARACK

INSECTS

Larch budmoth, *Zeiraphera improbana* (Wlk.)

The infestations of this needleworm on larch are not very harmful as they do not last long.

Year	Remarks
1975	Low-level populations at Saint-Léon-le-Grand (Matapédia).
1976	Pockets of low-level infestation near Saint-Moïse, Saint-Cléophas, Petite-Matane, and Saint-Léon-le-Grand.
1977	Population levels high at Gaspé, low to moderate at Saint-Moïse, and low at Sainte-Blandine.
1978	Levels high at Saint-Cléophas, Lac-Humqui, Saint-Léon-le-Grand, Gaspé, and Douglastown, moderate at Saint-Alexandre-des-Lacs, and low at Saint-Marcellin, Saint-Moïse, Saint-Adelme, and Bonaventure. Also, low levels on white spruce at Saint-Jogues.
1979	Traces.
1980	Low levels on a farm woodlot at Caplan.
1982	Low levels near Nouvelle [Allard].

TAMARACK

Larch casebearer, *Coleophora laricella* (Hbn.)

Major defoliation by this casebearer results in decreased growth. Infestations, however, last only a few years.

Year	Remarks
1949	Abundant north of New Carlisle and southeast of Rimouski.
1950	Moderate defoliation in the center of the Rimouski-Matane plateaus.
1952	Present in the nursery at Macpès.
1953	Sample taken at Sainte-Blandine.
1958	Light infestations nearly everywhere.
1968-1972	Population endemic.
1973	25% defoliation at Saint-Eugène-de-Ladrière (Rimouski).
1974	Light damage at Saint-Moïse and Amqui and in Kamouraska CD.
1975	Light defoliation at Saint-Moïse.
1976-1978	Traces.
1979	Some trees lightly defoliated at Métis-sur-Mer.
1980	Moderate population on isolated trees at Rimouski.

TAMARACK

Larch sawfly, *Pristiphora erichsonii* **(Htg.)**

Persistent high-level infestations of this sawfly, which lives in colonies, can lead to the mortality of a large percentage of trees in larch stands.

Year	Remarks
1938	Moderate-level infestations in Kamouraska and Bonaventure CDs and in the southern part of Témiscouata and Gaspé-Est CDs. Low levels in the rest of the territory.
1939	Abundant near Saint-Fabien.
1940	Traces.
1941	Decrease in population at Saint-Fabien, chiefly due to parasitism.
1953	Present at Lac Mitis (Matapédia).
1958	High infestation levels in the Rimouski area.
1960	Low population levels at several sites.
1963-1964	Population endemic.
1966	Centers of high infestation reported at Carleton and near New Carlisle.
1967	Population maintained or declining slightly in the above localities.
1968	Once again, severe damage at New Carlisle.
1969	High infestation levels near Sainte-Angèle-de-Mérici.
1970	Low defoliation levels near Escuminac and Mont-Carmel.
1971	Levels moderate near Saint-Cyprien and low north of Lac de l'Est (Kamouraska).
1972	Local defoliation, levels moderate north of Saint-Siméon [Gravel] and low at Bonaventure.
1973	Moderate damage east of Murdochville.
1974	Centers of high infestation northeast of Causapscal and at Saint-Omer. Moderate infestation for the second year east of Murdochville. Low population levels south of Saint-Léon-le-Grand.
1975	Severity of infestation remained unchanged at Causapscal, but declined to the low category at Saint-Omer and Murdochville. Low population levels southeast of Mont Jacques-Cartier, at Lac Oatcake (Gaspé-Ouest), and at Gaspé.
1976	Damage light to moderate at Caplan, light east of Murdochville and at Luceville, Bonaventure, and Saint-Omer. Low population levels at several sites in Kamouraska and Témiscouata CDs.

TAMARACK

1977	Low level of infestation east of Murdochville. Low-level populations at Saint-Alexandre, Saint-Arsène, Cabano, and Pointe-au-Père.
1978	Low population levels near Murdochville.
1979-1980	Traces only.
1987	Found near Saint-Edgar and New Carlisle.

TAMARACK

INSECT	YEAR	HOST	REMARKS
Chainspotted geometer *Cingilia catenaria* (Drury)	1973	Ericaceae, TL, AL, TA, WI.	Infestation in a bog with an area of 50 km² at Rivière-Ouelle where defoliation was total over 5 km².
	1974	Ericaceae, TL.	Up to 80% defoliation in the bogs of Kamouraska CD.
	1975	Ericaceae, TL.	Decrease in infestation.
Green larch looper *Semiothisa sexmaculata* (Pack.)	1940	TL.	Light defoliation in Painchaud canton (Kamouraska).
	1941	TL.	Another light defoliation in Painchaud canton (Kamouraska) with Ixworth canton (Kamouraska) being added to the infested area.
	1977	TL.	Low populations at Amqui and Saint-Fabien.
	1978	TL.	Low populations at Métis-sur-Mer.
	1979	TL.	Low populations at Saint-Majorique.
Onelined larch sawfly *Anoplonyx canadensis* Htgn.	1951	TL.	Population particularly abundant in the seigneury of Grande-Rivière.

TAMARACK

INSECT	YEAR	HOST	REMARKS
Spruce spider mite *Oligonychus ununguis* (Jac.)	1985	TL.	General yellowing of the foliage on the majority of the 1 300 000 stems in a plantation located 70 km north of Caplan, Lac McKay.
	1986	TL.	Over 25% of foliage affected on 56% of stems in a plantation of more than 100 000 trees, 5 km north of Lac Paradis, Dugal canton (Bonaventure).
Threelined larch sawfly *Anoplonyx luteipes* (Cress.)	1941	TL.	Noticeable defoliation of young trees in the Macpès nursery.

TAMARACK

Partial list of other insects encountered in the region

English name	Latin name	Preferred host(s)
Balsam fir false looper	*Syngrapha rectangula* (Kby.)	BF, TL.
Black larch aphid	*Cinara laricifex* (Fitch)	TL.
Eastern larch beetle	*Dendroctonus simplex* Lec.	TL.
False hemlock looper	*Nepytia canosaria* (Wlk.)	TL.
Fringed looper	*Campaea perlata* (Gn.)	SM, WB, TL, WS, BF, DEC, CON.
Gray spruce looper	*Caripeta divisata* Wlk.	BF, WS, JP, BS, NS, TL.
Larch shoot moth	*Argyresthia laricella* Kft.	TL.
November moth	*Epirrita autumnata henshawi* (Swett)	BF, TL, WS, SM, RM, CON, DEC.
Pine looper	*Hypagyrtis piniata* (Pack.)	BF, WS, TL, EWP, RS, JP.
Redstriped needleworm	*Griselda radicana* Heinr.	WS, S, BF, TL.
Saddleback looper	*Ectropis crepuscularia* (D. & S.)	BF, TL, WS, SM, TA,CON, DEC.
Small conifer looper	*Eupithecia transcanadata* Mack.	WS, BF, BS, NS, TL.
Spruce harlequin	*Palthis angulalis* (Hbn.)	WS, JP, TL, CON.

N.B.: Some species are polyphagous, attacking both coniferous and deciduous trees.

TAMARACK

DISEASES

ORGANISM	YEAR	HOST	REMARKS
Needle rust	1977	TL.	Low to moderate infections near Cabano and Rivière-du-Loup.
Melampsora paradoxa Diet. & Holw.	1978	TL.	20% of foliage infected in a small plantation at the Lac Saint-Ignace arboretum east of Cap-Seize (Matane).
	1982	TL.	Moderate infections covering 3 ha at Saint-Alexandre-des-Lacs and in a small stand in the Matane Wildlife Reserve.

TAMARACK

Partial list of other diseases and pathogenic agents encountered in the region

English name	Latin name	Preferred host(s)
Potebniamyces canker	*Potebniamyces coniferarum* (Hahn) Smerlis	SP, TL.

OTHER CONIFEROUS SPECIES

INSECTS

Partial list of other insects encountered in the region

English name	Latin name	Preferred host(s)
Dotted line looper	*Protoboarmia porcelaria indicataria* (Wlk.)	CON.
Filament bearer	*Nematocampa limbata* (Haw.)	BF, WS, WB, CON, DEC.
Fir harlequin	*Elaphria versicolor* (Grt.)	WS, CON, JP, RP.
Fringed looper	*Campaea perlata* (Gn.)	SM, WB, TL, WS, BF, DEC, CON.
Gypsy moth (male adults only)	*Lymantria dispar* (L.)	CON, DEC.
Looper	*Melanolophia signataria* (Wlk.)	CON, DEC.
Needle miner	*Coleotechnites atrupictella* (Dietz.)	WS, CON.
November moth	*Epirrita autumnata henshawi* (Swett)	BF, TL, WS, SM, RM, CON, DEC.
Redlined conifer caterpillar	*Feralia jocosa* (Gn.)	BF, WS, CON.
Saddleback looper	*Ectropis crepuscularia* (D. & S.)	BF, TL, WS, SM, TA, CON, DEC.
Smoky moth	*Eilema bicolor* (Grt.)	BF, CON.
Speckled green fruitworm	*Orthosia hibisci* (Gn.)	DEC, CON.
Spruce harlequin	*Palthis angulalis* (Hbn.)	WS, JP, TL, CON.
Whitetriangle leafroller	*Clepsis persicana* (Fitch)	WS, BF, CON.
Yellowlined conifer looper	*Cladara limitaria* Wlk.	CON.

N.B.: Certain species are polyphagous, attacking both coniferous and deciduous trees.

OTHER CONIFEROUS SPECIES

DISEASES

Bark splitting on conifer trees

This phenomenon is noted occasionally and locally in coniferous trees at the beginning of the growing season. Strips of bark are detached from the trunk, starting at the base of the tree, and remain hanging. This phenomenon is most common on dominant and co-dominant trees with a large crown exposed to the wind. It apparently occurs when heavy winds shake trees that are full of sap and also solidly rooted, especially in rocky soil, with their stumps still firmly frozen into the ground. This condition is seen in many places in the region.

Year	Remarks
1973	Damage observed on 2% of spruces in a 16-kilometre strip along the Petite Cascapédia River (Bonaventure).
1974	Observed on 10% of white spruce over 13 km^2 near Saint-Jogues.
1976	Numerous balsam fir and white spruce showed light to severe symptoms from the base of the trunk up to a height of one metre in Bonaventure, Matapédia, Matane, Gaspé-Ouest, Rimouski, and Kamouraska CDs.
1977	16% of balsam fir affected in a stand in the Matane Wildlife Reserve and 10% in another at Saint-Majorique. 30% of trees affected in a 2-ha stand of eastern white cedar at Saint-Charles-Garnier (Rimouski).
1978	Visible damage, chiefly on balsam fir, white and black spruce, and eastern white cedar, with 2 to 55% of trees affected. Only in Rivière-du-Loup CD was this phenomenon not reported.
1979	Damage found on 22% of white spruce at Chandler, 12% at L'Échouerie, and 8% at Cloridorme.
1980	At Lac Humqui (Matapédia), one study plot indicated that 29% of white spruce were affected - an increase of 2% over the previous year.

N.B.: The majority of the above percentages express cumulative damage at a given site.

OTHER CONIFEROUS SPECIES

Snow breakage

This is a relatively common type of damage which consists in breakage of branches due to an excessive accumulation of heavy snow. Pines are most often affected and the damage is especially apparent in young plantations. Some cases are described below by way of example.

Year	Remarks
1969	Many trees damaged because of heavy snowfalls the previous winter. Pines were the most heavily affected coniferous species in many plantations in Kamouraska, Rimouski, and Bonaventure CDs.
1970	Abundant damage on branches and trunks of many resinous species in Kamouraska CD.
1971	Damage similar to that of the previous year. Pines were the chief victims.
1972	Plantations of red pine in Rimouski CD and of jack pine and Scots pine in Rivière-du-Loup CD suffered the greatest damage.
1974	Damage, mostly moderate, observed on pines and white spruce between Rimouski and New Richmond and on balsam fir around the McGerrigle mountains (Gaspé-Ouest).
1975	Most reported damage on pines in Kamouraska, Témiscouata, and Rivière-du-Loup CDs and between Amqui and Gaspé.
1976	Light to moderate damage in several plantations of red pine and jack pine in Matane, Matapédia, Gaspé-Est, and Bonaventure CDs.
1977	Several reports of moderate to severe damage (between 10 and 50% of the crown affected) in plantations of red pine and jack pine in Matane and Bonaventure CDs.
1978	Many reports of low to moderate levels of damage in plantations of red pine and jack pine located in a strip 75 km wide extending from La Pocatière to Cap-Chat.
1980	Moderate to severe damage on red pine in several plantations near Matane, Sainte-Paule, Sainte-Irène, and Saint-Octave-de-Métis. Symptoms visible on 50% of jack pines in a small plantation at Cap-Chat.
1982	Very frequent damage, especially in plantations of red pine and jack pine in Rimouski, Matane, and Bonaventure CDs. Balsam fir also affected in young

OTHER CONIFEROUS SPECIES

stands near Grande-Vallée and Murdochville. The damage levels were, in most cases, moderate to high.

1984 The areas with the most frequent and severe damage were located in Témiscouata and Rivière-du-Loup CDs.

OTHER CONIFEROUS SPECIES

Winter drying injury

This problem is characterized by drying followed by reddening or browning of the needles (especially the older ones) on coniferous trees. This occurs especially in late winter and early spring when the needles dry out in warm winds on sunny days. In plantations, the symptoms are often observed on young trees where they protrude above snow level when the phenomenon occurs. The symptoms gradually clear up with the onset of the new growing season; buds are rarely affected.

Year	Remarks
1962	Severe reddening of old foliage on red spruce throughout the southwestern part of Administrative Region 01 as far as Témiscouata CD.
1963	Particularly severe damage near Percé and Chandler where the conifers were almost completely red.
1964	High degree of reddening on eastern white pine between La Pocatière and Rivière-du-Loup.
1965	Browning observed on balsam fir on the mountainsides in the Gaspé Conservation Park over an area of 260 km^2; also, at Caplan, severe damage on several ornamental conifers.
1968	Drying injury present at several sites, but no significant damage to report.
1969	Browning of needles on annual growth was noticeable on conifers (mainly spruces, pines and fir) near La Pocatière and Mont-Joli.
1970	Trace and low-level damage on conifers in Kamouraska and Témiscouata CDs.
1972	Eastern white cedar damaged in Bonaventure and Gaspé CDs.
1973	Reddening of 40% of the crown on 30% of stems in several plantations in Matane CD.
1974	Moderate drying injury on balsam fir 40 km northwest of Grande-Cascapédia and light injury at a site 51 km north of Saint-Edgar; low injury levels elsewhere in the Gaspé peninsula.
1975	Damage observed on red pine: moderate at Rimouski and Petite-Matane, low at Lac-au-Saumon.
1976	Reddening on 30 to 70% of foliage in several young plantations of red pine west of Rimouski and in Matane and Matapédia CDs; also, 20% of foliage affected on jack pine south of Les Méchins.

OTHER CONIFEROUS SPECIES

1977 Light damage on Scots pine at Nouvelle.

1978 Drying injury to 15% of foliage on eastern white cedar (10 000 seedlings) and 35% on red pine (600 stems) at the Sainte-Luce nursery (trees used as a windbreak). Moderate damage at Saint-Modeste, Grand-Métis, and Bic and light damage at Matane and Sainte-Anne-des-Monts.

1979 Fourth consecutive year of moderate damage in a 10-year-old plantation of 150 red pine stems at Bic.

1980 Up to 20% of foliage was affected on 80% of stems in a red pine plantation at Rimouski; on 100% of stems in a plantation at Sainte-Flavie; on 75% of stems in a plantation at Mont-Saint-Pierre; and on 80% of stems in a plantation at Sainte-Anne-des-Monts. On Scots pine, 18% of foliage was affected in a plantation of 8000 trees near Rivière-du-Loup. On black spruce, 40% of the 8 000 trees planted were affected at Sainte-Marguerite.

1982 Phenomenon observed throughout AR-01. In plantations, the most affected species were red and white pine, with the damage ranging from low to high in intensity. Along the edges of natural forests; balsam fir, spruce, and eastern white cedar were most affected, but only lightly.

1983 No damage reported.

OTHER CONIFEROUS SPECIES

ORGANISM	YEAR	HOST	REMARKS
Animal damage			
American red squirrel	1968	BF, BS.	Light damage at Saint-Marcellin in natural pole stage stands.
		WS.	Frequent damage in several plantations in Rimouski CD.
	1976	EWP.	Severe damage at Saint-Yvon [Grand-Étang].
	1982	JP.	Damage on 80% of trees planted near Cap-Seize and on about 40% of trees at Murdochville, La Martre, Saint-Donat, and Saint-René-de-Matane.
Industrial pollution	1961	CON.	Mortality spread as far as 7 km west of Murdochville. Cause: sulfur dioxide from mining operations.
	1974	CON.	At Murdochville, the area affected reached 130 km^2.
Snowshoe hare	1969	RP, SP, JP.	Light to moderate damage in plantations at Sainte-Hélène and Saint-Gabriel-Lalemant [Saint-Gabriel-de-Kamouraska].
	1970	SP.	5% mortality of stems in a young plantation at Saint-Gabriel-Lalemant [Saint-Gabriel-de-Kamouraska].
	1974	RP.	43% of trees affected at Métis-sur-Mer.
	1975	NS.	More than 4 ha severely attacked in Matane CD.

OTHER CONIFEROUS SPECIES

Partial list of other diseases
and pathogenic agents
encountered in the region

English name	Latin name	Preferred host(s)
Gall rust	*Gymnosporangium clavariiforme* (Pers.) DC.	J.

DECIDUOUS SPECIES

ALDERS

INSECTS

Woolly alder sawfly, *Eriocampa ovata* (L.)

This sawfly occasionally causes total defoliation of stands of speckled or American green alder.

Year	Remarks
1974	Moderate to severe local defoliation at New Richmond, Caplan, and Paspébiac; light at Maria [Guité].
1975	Low population levels at Kelly, Paspébiac, Port-Daniel, Saint-Elzéar (Bonaventure), and Sainte-Paule [Sainte-Paula].
1976	Defoliation of 40% of foliage in the Bic Conservation Park [Cap-à-l'Orignal]; low population levels at Paspébiac and Saint-Godefroi.
1977	Low population levels at New Richmond.
1978	A few trees were moderately defoliated at New Richmond.
1981	70 to 100% defoliation over about 40 km^2 between New Carlisle and Shigawake.
1982	Collapse of the previous infestation.

ALDERS

INSECT	YEAR	HOST	REMARKS
Alder flea beetle *Altica ambiens* Lec.	1941	AL.	Severe defoliation at Gaspé.
Duskyback leafroller *Archips mortuana* Kft.	1982	AL.	Low levels along 0.5 km of highway near Saint-Cléophas.
European alder leafminer *Fenusa dorhnii* (Tisch.)	1975	AL.	43% of leaves infested at Saint-Elzéar (Bonaventure) and 52% at York-Centre.
	1977	AL.	20% of leaves mined south of Sainte-Anne-des-Monts.
	1978	AL.	34% of foliage affected on 1 800 young black alder plants at the Bonaventure Arboretum near Saint-Elzéar.
	1982	AL.	50% of leaves mined west of Matane and east of Saint-Majorique.
	1983	AL.	Increase east of Saint-Majorique; 90% of leaves attacked.
Small leaf chafer *Serica tristis* Lec.	1943, 1946	AL, S, PO.	Severe defoliation in Bonaventure CD.
Striped alder sawfly *Hemichroa crocea* (Geoff.)	1940	AL.	Moderate defoliation in Newport canton (Gaspé-Est).
	1941	AL.	60% defoliation in Blais canton (Matapédia).
	1976	AL.	Light defoliation over 2 ha near Saint-Cléophas.

ALDERS

INSECT	YEAR	HOST	REMARKS
	1978	WB.	50% defoliation over 1.0 ha at a site 26 km southwest of Lac-Humqui.
	1979	WB.	Moderate levels at the same site.
Woolly alder aphid *Paraprociphilus tessellatus* (Fitch)	1943	AL.	Abundant in Matane CD.
	1975, 1977, 1978, 1983	AL.	Low population levels locally in Bonaventure, Gaspé-Ouest, and Matapédia CDs.

ALDERS

Partial list of other insects encountered in the region

English name	Latin name	Preferred host(s)
Alder dagger moth	*Acronicta dactylina* Grt.	AL, WI, TA, PCH, BPO.
Cherry leafcone caterpillar	*Caloptilia invariabilis* (Braun)	PCH, WB, AL, YB, SM, DEC.
Green aspen leaftier	*Pandemis canadana* Kft.	TA, YB, WB, WI, WE, AL, SM.
Large willow sawfly	*Trichiosoma triangulum* Kby.	WI, TA, BPO, BAS, AL.
Onespotted variant	*Hypagyrtis unipunctata* (Haw.)	SM, AL, DEC.
		DEC.
Pale green notodontid	*Gluphisia septentrionis* Wlk.	TA, BPO, AL, DEC.

ASHES

INSECTS

INSECT	YEAR	HOST	REMARKS
Ash flower gall mite *Aceria fraxiniflora* (Felt)	1966	BAS.	Low population levels at Saint-Marc-du-Lac-Long [Les Étroits].
Spiny ash sawfly *Eupareophora parca* (Cress.)	1978	BAS.	Low levels on about a hundred trees northeast of Saint-Guy.
Spotted tussock moth *Lophocampa maculata* Harr.	1974	RAS.	Light defoliation on a few trees at Val-Brillant.

ASHES

Partial list of other insects encountered in the region

English name	Latin name	Preferred host(s)
Large willow sawfly	*Trichiosoma triangulum* Kby.	WI, TA, BPO, BAS, AL.
Noctuid moth	*Lithophane innominata* (Smith)	SM, TA, WB, WAS, DEC.

BEECH

INSECTS

Beech scale, *Cryptococcus fagisuga* Lind.

This insect, which affects beech, is becoming more and more widespread in Quebec. Major infestations are eventually followed by **beech bark disease.**

Year	Remarks
1965	First observation in Quebec, at Saint-Marc-du-Lac-Long [Les Étroits].
1966	Distribution unchanged.
1968	Evidence of infestation found on certain trees at Packington (Témiscouata).
1969	Slight increase in populations.
1971	New center of infestation discovered in Bonaventure CD.
1972	Expansion of infested areas: southern parts of Kamouraska and Témiscouata CDs, and one area east of Matapédia. High population levels at Pointe-à-la-Garde.
1973	Population levels unchanged at the latter site; low at Saint-André-de-Restigouche [Saint-Fidèle-de-Ristigouche].
1974	Moderate population levels at Pointe-à-la-Garde.
1975	Discovery of insect populations ranging from low to high levels on trunks near Saint-Fabien. Moderate population levels at Pointe-à-la-Garde and at Restigouche.
1976	New spot of infestation in a 4-ha stand at Saint-Simon with 82% of trunks affected, 22% of them to a high level. Situation stable at Pointe-à-la-Garde.
1978	No change at Pointe-à-la-Garde.
1979	80% of trees lightly attacked at Saint-Simon.
1980	Populations rose to high levels at Pointe-à-la-Garde and in two stands near Saint-Simon. Moderate levels at Saint-Fabien.
1985	Little change in insect's distribution since 1980.

BEECH

DISEASES

Beech bark disease, *Nectria coccinea* (Pers. ex Fr.) var. *faginata* Lohm. Wats. & Ayers

This disease was introduced into the Maritimes at the beginning of the century. An infestation of stands by the **beech scale** (*Cryptococcus fagisuga* Lind.) necessarily precedes the onset of the fungus by a few to several years. Tree mortality follows. At present the disease is found in isolated locations throughout southern and central Quebec with a few pockets in the Lower St. Lawrence.

Year	Remarks
1965	Unsuccessful search for the disease in the zone infested by the **beech scale** in Témiscouata CD.
1971	First collections of the pathogen at Packington and Saint-Marc-du-Lac-Long [Les Étroits].
1972	Fungus found at Pointe-à-la-Garde.
1973	Moderate-level infection at Pointe-à-la-Garde.
1974	Situation comparable to 1973.
1975	Report of moderate infection from Saint-Fabien.
1976	No change.
1979	23% of trees affected in a stand near Saint-Simon.
1980	1% increase in infected subjects in the Saint-Simon stand. The level of infection at Pointe-à-la-Garde remained similar to what it was in 1973 and 1974.
1984	Four surveys near Saint-Simon indicated a level of infection of between 32 and 80%.
1985	No change noted in the distribution of the disease.
1987	High level of infection at Pointe-à-la-Garde.

BEECH

ORGANISM	YEAR	HOST	REMARKS
Nectria canker *Nectria galligena* Bres.	1987	BE.	High level of infestation at Mont-Carmel.

BIRCHES

INSECTS

Ambermarked birch leafminer, *Profenusa thomsoni* (Konow)

Attacks by this leafminer occur toward mid-summer. They cause nearly total browning on white birch foliage, sometimes over wide areas.

Year	Remarks
1965	The largest populations located southeast of Les Méchins [Saint-Paulin-Dalibaire], Grosses-Roches, Mont-Louis, and Murdochville.
1966	Abundant, especially in the localities of Marsoui, Petite-Vallée, Rivière-la-Madeleine, Ruisseau-Castor, and Saint-Yvon [Grand-Étang].
1967	Expansion of affected areas. Moderate to high levels of infestation from Sainte-Félicité to Les Méchins, from Sainte-Anne-des-Monts to Anse-Pleureuse and in the bay of the Gaspé area.
1968	Traces only.
1969	Low population levels at Rimouski and at Sainte-Angèle-de-Mérici.
1970	High population levels between Murdochville and Gaspé.
1972-1974	Presence noted.
1975	A few pockets of low-level infestation in Bonaventure, Matane, and Matapédia CDs.
1976	A single low-level infestation in Matapédia CD.
1977	One spot of high-level infestation south of Lac Mitis (Matapédia) and two light spots near Causapscal.
1978	Infested zone made up of a narrow strip crossing the Gaspé Peninsula from southwest to northeast (8 to 60% of leaves mined with a mean figure of 35%).
1979	Trace to moderate levels of infestation nearly everywhere on the Gaspé Peninsula.
1980	Concentrations of moderate to severe damage located between the Matapédia and Petite Cascapédia Ouest rivers (Bonaventure) and in the northern part of Gaspé-Est and Gaspé-Ouest CDs.
1981	Small pocket of severe intensity southwest of Amqui. Moderate infestation over 10 ha at a site 63 km northeast of Saint-Edgar [Robidoux]. Low levels of

BIRCHES

infestation in two areas covering 55 km^2 in the Rimouski Wildlife Reserve and another of the same intensity covering an area of 7 km^2 from Anse-Pleureuse to Madeleine Centre.

1982 The previous year's two pockets at the Rimouski Wildlife Reserve almost completely disappeared. Three new cases of infestation of moderate to high intensity observed over 1 800 ha south of Manche-d'Épée and over about 200 ha each at Anse-Pleureuse and Gros-Morne.

1983 Slight decrease in spread in the area south of Manche-d'Épée and a slight increase in the one at Anse-Pleureuse.

BIRCHES

Birch casebearer, *Coleophora serratella* (L.)

Severe defoliation by this casebearer causes dieback and even mortality in white birch. During outbreaks it also causes severe damage to speckled alder.

Year	Remarks
1963	Frequent damage in the northern part of Gaspé-Est and Gaspé-Ouest CDs and in Témiscouata CD.
1964	Visible defoliation in the above CDs, but not as common. Defoliation exceeding 25% at several sites in Bonaventure and Matapédia CDs, and in the southern part of Gaspé-Est.
1965	General decline in damage except in certain localities in Témiscouata CD, along Baie des Chaleurs, and between Percé and Gaspé where moderate to severe browning occurred.
1966	Decrease in the number of pockets of infestation; moderate to severe levels near Mann Settlement [Millstream], Pointe-à-la-Garde, Chandler, Percé, and Gaspé.
1967	Substantial increase in populations. Generally moderate to severe defoliation except in Kamouraska CD and the central and northern part of the peninsula where little damage occurred. In the north, infestations were limited in the Mont-Louis and Mont-Saint-Pierre areas.
1968	High levels of infestation over more than 40 000 km^2. Only an area in the center of the peninsula was unaffected.
1969	Appreciable decline in the population except in Témiscouata CD where major defoliation was still occurring.
1970	Population increasing.
1971	Population increasing. Severe defoliation in Kamouraska, Témiscouata, Rimouski, Matane, and Gaspé-Ouest CDs and in the northern part of Gaspé-Est. Defoliation moderate in Matapédia CD and light in the southern part of Gaspé-Est CD.
1972	General decline in populations, but infestations still ranging from moderate to high in Rimouski and Matane CDs, along the Cascapédia River (Bonaventure), and near La Pocatière.
1973	Populations less abundant; local infestations moderate to high.

BIRCHES

1974	Areas of moderate and high infestation between La Pocatière and Sainte-Félicité with extension along the Matapédia valley as far as Carleton. Two areas of moderate intensity near the bay of Gaspé.
1975	Zone of moderate to high infestation throughout the region with the exception of Matane CD and parts of Bonaventure and Gaspé-Est CDs.
1976	Infestation covering the whole territory, but, in general, appreciable decline in the level of attack.
1977	The greatest concentrations of high infestation were located between Rimouski and Saint-Damase, in the northern and northwestern parts of Kamouraska and Rivière-du-Loup CDs and in the southeastern part of Témiscouata CD.
1978	Decline in infestation levels between Rimouski and Saint-Damase. Severe defoliation frequent in Témiscouata CD; 10% mortality over 1 ha at Trois-Pistoles as a result of repeated heavy defoliation over a five-year period.
1979	Numerous local infestations everywhere between La Pocatière and Gaspé.
1980	General increase in populations; numerous cases of light and moderate defoliation except in the Baie des Chaleurs area, which was almost entirely spared.
1981	General decline in populations; damage mostly light, but in some cases moderate and limited at sites near Percé, Port-Daniel, and Bonaventure. Severe browning on speckled alder over 5 km near Maria and over 300 ha at New Richmond.
1982	The population decrease continued: 30% defoliation locally near Sainte-Irene and a pocket of light infestation over 800 ha between Sainte-Florence and Routhierville. Disappearance of the centers of defoliation mentioned in 1981 on white birch, but two pockets on speckled alder were maintained.
1983	General upsurge in population with a total of 7 980 ha infested on which white birch represented about 30% of the stands' species composition. The main regions affected were Rivière-du-Loup, Rimouski, the Matapédia valley, the north shore of the peninsula, Gaspé, and Percé.
1987	Light damage northeast of Saint-Noël.

BIRCHES

Birch leafminer, *Fenusa pusilla* (Lep.)

The birch leafminer sometimes produces as many as three generations in a season. It does not cause as much browning of foliage in Administrative Region 01 as elsewhere in the southern part of the province where its preferred host, grey birch, is more common.

Year	Remarks
1941	Light attack in the Gaspé and in the Matapédia valley.
1942	Browning of foliage observed in Témiscouata CD.
1963-1966	Commonly collected, but no assessment of its degree of abundance.
1967	High levels of infestation at Dégelis [Sainte-Rose-du-Dégelis] and at the Macpès Forestry Training Center; moderate infestation at Cap-Chat.
1972	Abundant, but little visible damage (masked by birch casebearer damage).
1973	Low population levels south of Lac Témiscouata and southeast of Cap-Chat [Saint-Octave-de-l'Avenir].
1974	Low population levels at several sites scattered throughout the territory.
1975	A few pockets of moderate infestation in the Matapédia River valley and the western part of Bonaventure CD and numerous spots of low-level infestation throughout the territory.
1976	Population levels moderate northwest of Saint-Elzéar (Bonaventure) and south of Cap-Chat and low nearly everywhere else in the territory.
1977	Little change from the previous year. Moderate populations east of Mont Albert and at Grande-Vallée.
1978	Major upsurge in populations in all CDs east of Rimouski.
1979	General decline.
1980	Slight increase in populations.
1981	Light defoliations in two areas covering 55 km^2 in the Rimouski Wildlife Reserve and another of 7 km^2 running from Anse-Pleureuse to Rivière-la-Madeleine; at a site 62 km northwest of New Richmond 30% of leaves mined and at a site 66 km north of Nouvelle, 20%.
1982	Several pockets of low to moderate infestation in Bonaventure, Gaspé-Est, Gaspé-Ouest, Matane, Matapédia, and Rimouski CDs.
1983	85% of foliage mined over 125 ha at Gros-Morne.

BIRCHES

Birch sawfly, *Arge pectoralis* (Leach)

This sawfly can cause severe defoliation in white birch stands. However, infestations are never over large areas, nor are they persistent.

Year	Remarks
1938	Abundant from Matapédia to New Carlisle and along Baie des Chaleurs.
1939	Total defoliation near Bic and in Duquesne canton (Rimouski).
1940	Defoliation severe but local in Estcourt canton (Témiscouata), moderate in Packington canton (Témiscouata) and light along the York River (Gaspé-Est).
1941	Light and limited defoliation in Duquesne canton (Rimouski).
1943	Light damage in some areas along Baie des Chaleurs.
1944	Severe defoliation in a large stand near Baie des Chaleurs. Present in the Rimouski-Matane area.
1945	Damage severe at Chandler, less intense at Rivière-du-Loup.
1948	Partial defoliation locally west of the Matapédia River (Bonaventure).
1949	Severe defoliation in the Lac Témiscouata region.
1950	Severe damage east of Trois-Pistoles and west of Sainte-Florence; moderate at Pohénégamook [Estcourt] and east of Cacouna.
1951	Decline in population levels.
1962	Low incidence at Saint-Patrice.
1969-1980	Traces only.

BIRCHES

Birch skeletonizer, *Bucculatrix canadensisella* Cham.

The larvae of this insect eat only the parenchyma of the underside of the leaf and between the veins. Heavily affected leaves are reduced to a skeleton. The insect also contributes to birch dieback, but, fortunately, its infestations only last a few years.

Year	Remarks
1940	100% of leaves infested from Saint-Moïse to Matapédia; less severe infestation in the Lower St. Lawrence but with obvious damage.
1941	Severe defoliation in the southern part of the Gaspé Peninsula.
1953	High level of infestation at Grand Lac Squatec (Témiscouata).
1961	Up to 80% of leaves attacked on the peninsula.
1962	Infestation levels varying from low to high near Rimouski.
1963-1965	Traces only.
1967	Very low population levels.
1970	Large number of collections from Bonaventure and Gaspé-Ouest CDs.
1971	Low population levels near Saint-Jean-de-la-Lande and near Lac Rimouski.
1972-1974	Traces only.
1975	Common in the Gaspé.
1976	Severe defoliation reported south of Bic.
1977	Traces only.

BIRCHES

INSECT	YEAR	HOST	REMARKS
Birch lace bug *Corythucha pallipes* Parsh.	1941	WB, YB.	Frequent in the southern part of Bonaventure CD.
Birch leaffolder *Ancylis discigerana* (Wlk.)	1943	B.	Caterpillars abundant in August and September.
Bronze birch borer *Agrilus anxius* Gory	1938	B.	Population increasing in eastern Canada.
	1944	B.	Epidemic in Administrative Region 01. The insect appears to be abundant as a result of **birch dieback.**
Fringed birch sawfly *Dimorphopteryx melanognathus* Roh.	1943	B.	Moderate infestation in Matapédia and Matane CDs.
Late birch leaf edgeminer *Heterarthrus nemoratus* (Fall.)	1938	B.	Epidemic in the Matapédia valley and in certain parts of the Gaspé.
Lintner scale *Chionaspis lintneri* Comst.	1968	WB.	Severe outbreak at Lac Humqui (Matapédia).
	1969	WB.	Severe outbreak near Douglastown.
	1976	WB.	Low population levels at Grosses-Roches.
	1978	WB, STM.	Low population levels locally at La Rédemption and Pointe-à-La-Garde.
Pinkstriped oakworm *Anisota virginiensis* (Drury)	1941	B.	Found south of Saint-Esprit (Rimouski).

BIRCHES

INSECT	YEAR	HOST	REMARKS
Spearmarked black moth *Rheumaptera hastata* (L.)	1940	B.	Considerable defoliation in Rimouski CD.
	1941	B.	Light infestation in Matapedia CD.

BIRCHES

Partial list of other insects encountered in the region

English name	Latin name	Preferred host(s)
A leaf roller	*Pseudotelphusa belangerella* Cham.	WB.
Birch-aspen leafroller	*Epinotia solandriana* (L.)	TA, BPO, WB.
Birch tubemaker	*Acrobasis betulella* Hulst	WB.
Blackdotted birch leaftier	*Nites betulella* (Bsk.)	WB.
Cherry leafcone caterpillar	*Caloptilia invariabilis* (Braun)	PCH, WB, AL, YB, SM, DEC.
Dusky birch sawfly	*Croesus latitarsus* Nort.	YB.
Elm sawfly	*Cimbex americana* Leach	WB, TA, WI. DEC.
Filament bearer	*Nematocampa limbata* (Haw.)	BF, WS, WB, CON, DEC.
Fringed looper	*Campaea perlata* (Gn.)	SM, WB, TL, WS, BF, DEC, CON.
Green aspen leaftier	*Pandemis canadana* Kft.	TA, YB, WB, WI, WE, AL, SM.
Noctuid moth	*Lithophane innominata* (Smith)	SM, TA, WB, WAS, DEC.
Oak-maple humped caterpillar	*Schizura ipomoeae* Dbly.	WB, SM, CCH, DEC.
Pepper-and-salt moth	*Biston betularia cognataria* (Gn.)	WB, TA, WI, DEC, MO.
Polyphemus moth	*Antheraea polyphemus polyphemus* (Cram.)	RM, WB, WI, DEC.
White admiral	*Basilarchia a. arthemis* (Drury)	YB, DEC.

N.B.: Certain species are polyphagous, attacking both coniferous and deciduous trees.

BIRCHES

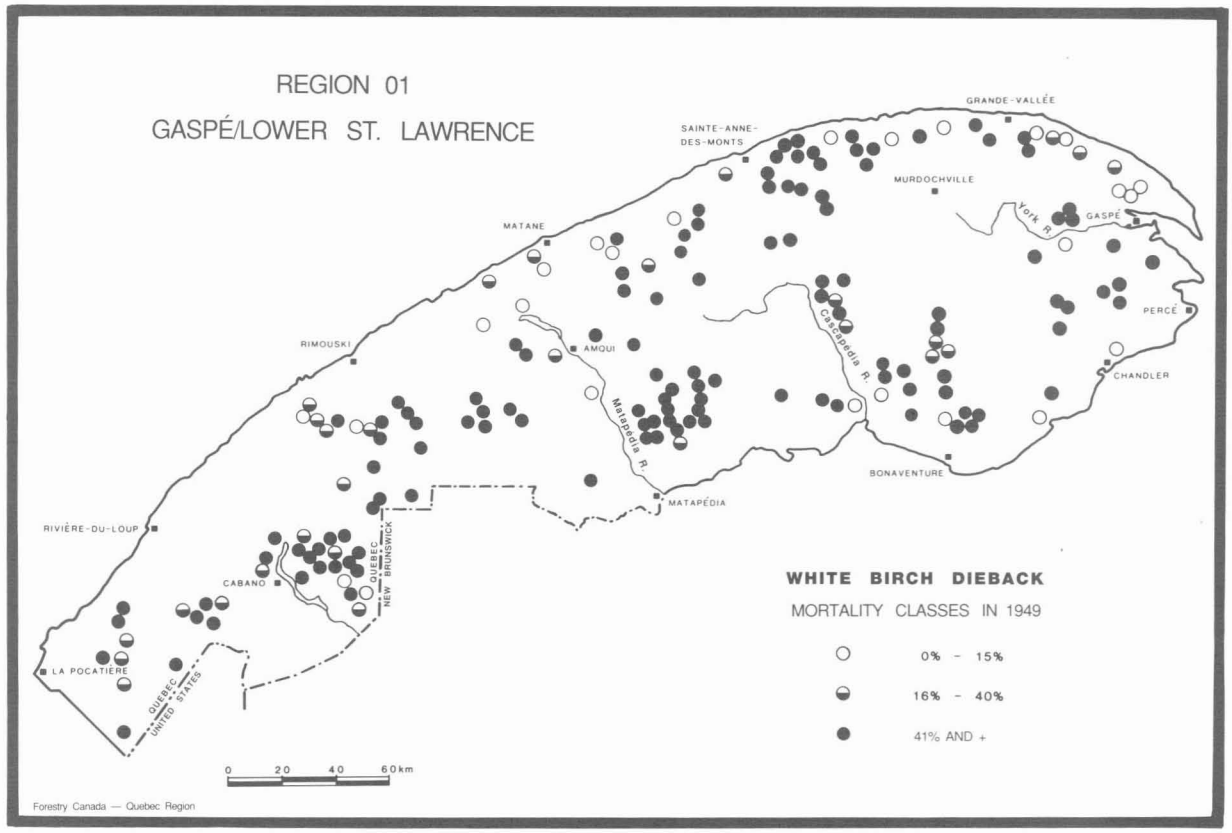
DISEASES

Birch dieback

Birch dieback is characterized by gradual mortality of the crown starting with the highest twigs; in time it can kill the tree. The precise causes of dieback have never been found despite the variety of hypotheses put forward including epidemics of insects, diseases, drought, and other factors. The earliest symptoms of the disease were observed in the late 1930s. The phenomenon first appeared in eastern Quebec, affecting the majority of white birch and yellow birch. Tree decadence became very significant in the Matapédia valley and in the Gaspé in 1943 and 1944. Renewed vigor of trees, however, was observed to some extent in both areas from 1946 to 1950, while elsewhere in the province the disease spread westward. The problem of birch dieback practically disappeared around 1966; at that time there only remained a few infected stands in the Quebec City area and in the Gaspé.

Year	Remarks
1935-1938	Appearance of dieback symptoms.
1939	First observations of damage caused by this disease, in the Matapédia valley and in the Gaspé.
1943	Paroxysm of the disease: it was concluded that *Agrilus anxius* Gory, a borer, was not the direct cause of the dieback.
1944	Severe dieback in the Gaspé and in the Matapédia valley, peaking in old cutover areas and mature stands.
1946	Appreciable improvement in the condition of trees in the Matapédia valley and in the Gaspé.
1947	A network of sample plots was established in Administrative Region 01. In the birch stands studied that year, dieback led to mortality of branches on less than half the crowns. Table 1, at the end of the text, gives follow-up results to 1955.
1948	Dieback remained severe in the Gaspé Peninsula, the Matapédia valley, and the Lower St. Lawrence with maximum mortality observed in the Baie des Chaleurs area (white birch) and the Gaspé area (yellow birch).
1949	The disease continued its ravages, but trees that at one point had been affected by dieback now had new foliage (see map, page 105).

BIRCHES



1950 An assessment of dieback in the stands studied in 1948, 1949 and 1950 showed that crown mortality had become generalized. Trembling aspen and maple showed symptoms at many sites in the region.

1953 In the Lower St. Lawrence, an advanced degree of dieback was present in most birch; there was a recurrence of dieback following a dry spell in the second half of the summer.

1954-1955 Young subjects no longer showed symptoms of dieback. In white birch, dieback over the last five years involved twig mortality in the upper crown; on yellow birch, it caused branch mortality over less than half the crown.

1966 Three isolated spots of low intensity detected in the Matapédia valley.

BIRCHES

TABLE 1. Annual assessment of dieback in certain stands in Region 01.

Year of Observation	WHITE BIRCH			YELLOW BIRCH		
	Number of trees examined	Trees affected %	Mortality* %	Number of trees examined	Trees affected %	Mortality %
1947	___	94	39	365	97	46
1948	___	97	50	___	99	43
1949	5517	96	56	726	98	67
1950	3759	93	59	661	99	67
1951	306	76	23	38	96	8
1952	263	81	30	74	90	20
1955	197	50	24	41	85	20

* Included in the % of trees affected.

BIRCHES

Leaf blister, *Taphrina carnea* Johans.

This type of disease produces swelling and crinkling on various kinds on leaves. The damage is apparent in late spring and, if abundant, it is the esthetic aspect of the tree that is affected. Several species of *Taphrina* may attack one or more species. The disease occurs on dwarf birch, white birch, and especially on yellow birch, as reported below.

Year	Remarks
1958	The earliest mention of the disease on dwarf birch (*B. glandulosa*) reported at Mont Jacques-Cartier.
1965	Severe damage observed locally southeast of Saint-Bruno-de-Kamouraska [Rivière-Manie] on yellow birch, the species that all subsequent reports have dealt with.
1967	Moderate infection at Saint-Eleuthère.
1969	Low-level infection noted at Saint-Marc-du-Lac-Long [Les Étroits].
1971	The appearance of the disease in the Grosses-Roches area was favored by atmospheric conditions.
1974	Low-level infections visible along the Matapédia River (Bonaventure) and in Rimouski CD.
1976	Small areas lightly infected in Bonaventure and Gaspé-Est CDs.
1981	75% of foliage affected over 4 ha at Saint-Médard.

BIRCHES

ORGANISM	YEAR	HOST	REMARKS
Septoria leaf spot *Septoria* sp.	1987	WB.	All foliage affected by this disease at Gros Lac (Gaspé-Est).

BIRCHES

Partial list of other diseases
and pathogenic agents
encountered in the region

English name	Latin name	Preferred host(s)
Nectria dieback	*Nectria cinnabarina* (Tode: Fr.) Fr.	WB, YB, SM.
Powdery mildew	*Phyllactinia corylea* (Pers.) Karst.	WB.

CHERRY TREES

INSECTS

Uglynest caterpillar, *Archips cerasivorana* (Fitch)

This insect has no major economic impact. Sometimes its larvae build tents that completely enclose a hedge of chokecherry, its preferred host, causing total defoliation.

Year	Remarks
1968	High levels of local infestation at Saint-Clément.
1969	Zones of moderate to high-level infestation between La Pocatière and Rivière-du-Loup extending as far as Dégelis [Sainte-Rose-du-Dégelis].
1970	Levels moderate to high at Mont-Carmel, Price, Amqui, and Carleton and low at Saint-Noël and New Richmond.
1971	High levels at Saint-Épiphane.
1972	Low- to high-level local infestations in the farming areas of Kamouraska, Rimouski, Matapédia, and Bonaventure.
1973	Traces only.
1974	Infestation at high levels at Black Cape, moderate at Albertville and Port-Daniel, and low at New Richmond and Pointe-à-la-Garde.
1975	Damage moderate at Bic and light at Grand-Métis.
1976	Rise in population: levels high at Grand-Métis and Saint-Simon, moderate at Lac-Humqui and in Kamouraska CD, and light near Wakeham.
1977	Some severe defoliation observed locally near La Pocatière, Kamouraska, Sainte-Angèle-de-Mérici, and Saint-Simon. Low population levels at Lac-Humqui (Matapédia).
1978	Abandonment of systematic sampling on these tree species.

CHERRY TREES

Partial list of other insects encountered in the region

English name	Latin name	Preferred host(s)
Alder dagger moth	*Acronicta dactylina* Grt.	AL, WI, TA, PCH, BPO.
Canadian tiger swallowtail	*Papilio glaucus canadensis* R. & J.	TA, BPO, PCH, DEC.
Cherry leafcone caterpillar	*Caloptilia invariabilis* (Braun)	PCH, WB, AL, YB, SM, DEC.
Oak-maple humped caterpillar	*Schizura ipomoeae* Dbly.	WB, SM, CCH, DEC.

CHERRY TREES

DISEASES

ORGANISM	YEAR	HOST	REMARKS
Black knot *Apiosporina morbosa* (Schw.) Arx	1974	PCH.	High infection levels at Saint-Alexandre-des-Lacs and along the Square Forks River (Matapédia).
	1975	PCH.	Moderate infection at Saint-Alexandre-des-Lacs.
		CCH.	High levels of infection in Kamouraska CD.
	1976	CH, PL.	Numerous reports from Gaspé-Est CD.
	1981	PCH.	Light infection by this fungus at Saint-Adelme.
Shot hole *Coccomyces hiemalis* Higgins	1961	PCH.	Very severe infection in the town of Gaspé.
	1974	PCH.	Low-level infections throughout Matane CD.

MAPLES

INSECTS

Bruce spanworm, *Operophtera bruceata* (Hulst)

This spanworm can cause severe defoliation in sugar maple and trembling aspen stands. Fortunately, its outbreaks are of short duration because of a viral disease that controls the insect. (See also **POPLARS**).

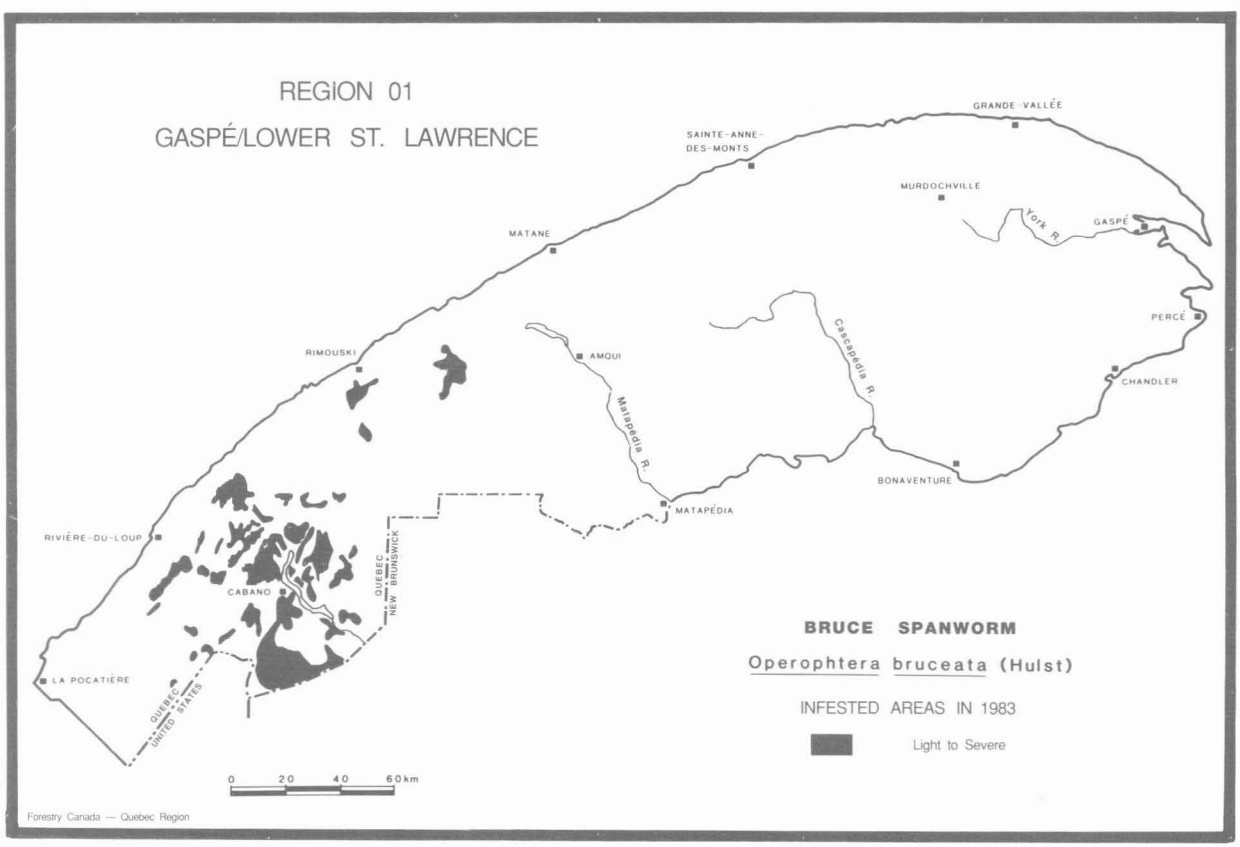
Year	Remarks
1962	Severe defoliation at Saint-Fabien.
1963	Zones of infestation in Témiscouata, Rivière-du-Loup, Rimouski, Matapédia, and Bonaventure CDs.
1964	Population in decline; severe defoliation limited to a few localities in Témiscouata, Rivière-du-Loup, and Bonaventure CDs.
1965	Small pockets of infestation in Bonaventure CDs.
1966-1967	Light defoliation (jointly with the **linden looper**) at Sainte-Hélène.
1968-1970	Traces only.
1971	Moderate to severe defoliation in Rimouski CD.
1972	Moderate and high-level infestations at Saint-Cléophas and Sainte-Rita.
1973	Limited infestation near Saint-Pacôme, Saint-Alexis-de-Matapédia, and Saint-Alphonse.
1974	Moderate damage at Saint-Alphonse and at Saint-Juste-du-Lac, light damage at Saint-Alexis-de-Matapédia.
1975	Collapse of the population.
1976-1979	Population endemic.
1980	Low population levels near Grand Lac Macpès (Rimouski).
1981	Reappearance of numerous pockets of low-level infestation over 8 ha near Rimouski, 10.5 ha north of Amqui and Saint-Damase, 46 ha at Saint-André-de-Restigouche, and 18 ha at Saint-Alexis-de-Matapédia.
1982	Rise in populations: severe defoliation over 80 ha at Sainte-Rita and over 120 ha at Saint-Jean-de-Dieu, moderate at Saint-Tharcisius (200 ha), Saint-Damase (13 ha), and Rimouski (10 ha), and light over 79 ha in the Matapédia area.

MAPLES

1983 Decrease in the intensity of the damage observed in 1982, but extension of the infested areas, particularly to the southwest. Pockets of generally low infestation covering 765 ha in Kamouraska CD; others were encountered as well (by decreasing order of importance) in Bonaventure, Rimouski, Témiscouata, Rivière-du-Loup, and Matapédia CDs (see map below).

1984 Residual pockets of infestation totalling only 1 km^2.

1985 No damage reported.



MAPLES

Linden looper, *Erannis tiliaria tiliaria* (Harr.)

This looper, which is sometimes associated with the **Bruce spanworm** in cases of sugar maple defoliation, causes less damage in Administrative Region 01 than elsewhere in the southern part of the province, where it damages many deciduous species significantly during its outbreaks.

Year	Remarks
1942	Abundant in deciduous forests.
1953	Present south of Lac Mitis (Matapédia).
1954	Reported in Bonaventure CD.
1956	In conjunction with the **Bruce spanworm**, the Linden looper caused moderate to severe defoliation in Ouimet canton (Rimouski).
1966-1967	Light defoliation (with the **Bruce spanworm**) at Sainte-Hélène.
1968-1982	Traces only.

MAPLES

Maple leafroller, *Sparganothis acerivorana* Mack.

This leafroller mainly damages red maple, though it can also be found on several other deciduous species. Defoliation is rarely total.

Year	Remarks
1976	Widespread but light damage in the distribution area of its host species.
1977	Zone of light to severe defoliation covering an area of 3 100 km^2 between Rimouski, Matane, and Causapscal. Another zone (700 km^2) showed light to moderate damage, and was located between L'Ascension-de-Patapédia and Saint-André-de-Restigouche [Saint-Fidèle-de-Ristigouche].
1978	Enlargement and merging of the infested zones in 1977, reaching Saint-Simon and Saint-Jean-de-Cherbourg in the north. However, in general, severity diminished. Also, numerous cases of local infestation of light to severe intensity encountered all along the north shore of the peninsula as far as Cap-des-Rosiers, with a few spots of low and moderate infestation along Baie des Chaleurs. The total infested area was close to 6 400 km^2.
1979	Situation comparable to 1978.
1980	Appreciable decrease in populations; area of low infestation in the Trois-Pistoles, Matane, and Causapscal triangle. However, moderate to high-level local infestations were found at Cap-aux-Os, Forillon National Park, Val-d'Espoir, New Richmond, Saint-Fabien, Saint-Damase, and Saint-Léon-le-Grand.
1981	Collapse of populations; low levels between Saint-Simon and Matane, and in the New Richmond area.
1982	Light defoliation over 2 km^2 at the Duchénier reserve, 1 km^2 at the Macpès Forestry Training Center, 15 ha at Maria, and locally at Saint-Octave-de-Métis.
1983	Collapse of populations.

MAPLES

INSECT	YEAR	HOST	REMARKS
Crimson erineum mite *Aceria regulus* (Hodge)	1975, 1976, 1977	SM.	Light to moderate damage in Bonaventure, Gaspé-Est, Matane, and Matapédia CDs.
Fall cankerworm *Alsophila pometaria* (Harr.)	1976, 1977	SM.	Low infestation in a maple stand at Sainte-Hélène (Kamouraska).
	1978	SM.	Collapse of the infestation in the maple stand at Sainte-Hélène.
Greenstriped mapleworm *Dryocampa rubicunda* (F.)	1940	M.	Damage apparent in the seigneury of Bic.
Maple-basswood leafroller *Sparganothis pettitana* (Rob.)	1968	SM.	Common.
Maple bladdergall mite *Vasates quadripedes* Shimer	1975, 1976, 1977	SM.	Light to moderate damage in Bonaventure, Gaspé-Est, Matane, and Matapédia CDs.
Maple spindlegall mite *Vasates aceris-crumena* (Riley)	1975, 1976, 1977	SM.	Light to moderate damage in Bonaventure, Gaspé-Est, Matane, and Matapédia CDs.
Ocellate gall midge *Acericecis ocellaris* (O.S.)	1967	RM.	Moderate-level infestation at Saint-François-d'Assise.
Sugar maple borer *Glycobius speciosus* (Say)	1983	SM.	During a special survey on dieback in maple stands, it was found that 1.3% of trees were infested, with an average of 1.3 galleries per tree.

MAPLES

Partial list of other insects encountered in the region

English name	Latin name	Preferred host(s)
Blackcheeked aspen caterpillar	*Ipimorpha pleonectusa* Grt.	TA, RM.
Boxelder leafworm	*Chionodes obscurusella* (Cham.)	SM.
Cherry leafcone caterpillar	*Caloptilia invariabilis* (Braun)	PCH, WB, AL, YB, SM, DEC.
Climbing cherry cutworm	*Crocigrapha normani* (Grt.)	SM, DEC.
Dusky leafroller	*Orthotaenia undulana* (D. & S.)	SM, TA, RM, BPO, DEC.
Elm spanworm	*Ennomos subsignaria* (Hbn.)	WE, SM, WI, BHA.
Fringed looper	*Campaea perlata* (Gn.)	SM, WB, TL, WS, BF, DEC, CON.
Gouty vein midge	*Dasineura communis* Felt	SM.
Green aspen leaftier	*Pandemis canadana* Kft.	TA, YB, WB, WI, WE, AL, SM.
Large false looper	*Zale minerea norda* (Sm.)	TA, DEC, SM.
Lesser maple spanworm	*Itame pustularia* (Gn.)	M, TA.
Lilac leafminer	*Gracillaria syringella* (F.)	LI.
Maple shoot borer	*Proteoteras moffatiana* Fern.	SM.
Maple trumpet skeletonizer	*Epinotia aceriella* (Clem.)	SM.
Noctuid moth	*Lithophane innominata* (Smith)	SM, TA, WB, WAS, DEC.
November moth	*Epirrita autumnata henshawi* (Swett)	BF, TL, WS, SM, MOM, RM, CON, DEC.

MAPLES

Oak-maple humped caterpillar	*Schizura ipomoeae* Dbly.	WB, SM, CCH, DEC.
Onespotted variant	*Hypagyrtis unipunctata* (Haw.)	SM, AL, DEC.
Polyphemus moth	*Antheraea polyphemus polyphemus* (Cram.)	RM, WB, WI, DEC.
Saddleback looper	*Ectropis crepuscularia* (D. & S.)	BF, TL, WS, SM, TA, CON, DEC.

N.B.: Certain species are polyphagous, attacking both coniferous and deciduous trees.

MAPLES

DISEASES

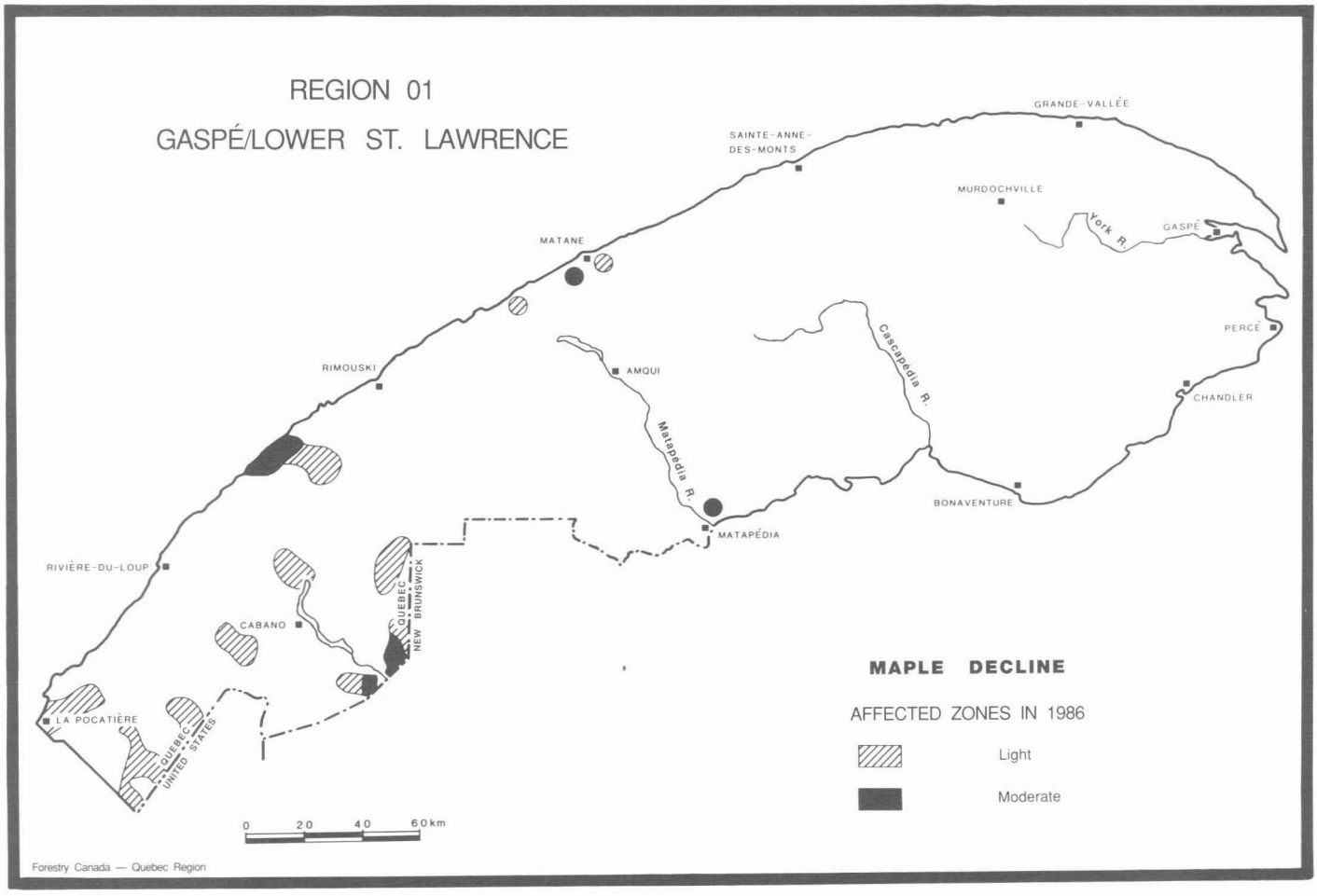
Decline of maple stands in Quebec

Several hundred maple stands in the province were the subject of a special survey in 1983 aimed at assessing the level of sugar maple decline. At that time, 33 maple stands in Administrative Region 01 were inspected. An average of 12% of stems observed showed abnormal signs of decline while 87% were deemed normal; mortality was 1%. Subsequent surveys by DER personnel have shown the extent and growth of this phenomenon. Where it exists, the severity of the decline varies greatly from one maple stand to another.

Decline results from a whole set of causes including stress from human activities. Stress-factors include atmospheric pollution (of which acid rain is one form) and, in some cases, improper management. There are also natural stresses such as defoliation by insects and major climatic variations. Such factors may act in isolation or simultaneously.

Year	Remarks
1983	Appearance of the problem; numerous symptoms of dieback visible near Rivière-du-Loup, Matane, and Matapédia. Also noted on other deciduous species.
1984-1986	Increase in incidence of symptoms (see map page 121).

MAPLES


REGION 01
GASPÉ/LOWER ST. LAWRENCE
GRANDE-VALLÉE
SAINTE-ANNE-DES-MONTS
MURDOCHVILLE
York R.
GASPÉ
MATANE
PERCÉ
RIMOUSKI
AMQUI
Cascapédia R.
CHANDLER
Matapédia R.
BONAVENTURE
MATAPÉDIA
RIVIÈRE-DU-LOUP
QUEBEC
NEW BRUNSWICK
CABANO
LA POCATIÈRE
QUEBEC
UNITED STATES
0 20 40 60 km
MAPLE DECLINE
AFFECTED ZONES IN 1986
Light
Moderate
Forestry Canada — Quebec Region

MAPLES

Eutypella canker, *Eutypella parasitica* Davidson & Lorenz

This trunk canker is commonly found on sugar maple and occasionally on other maples. It causes mortality on stems 10 cm or less in diameter and pronounced deformation on the trunks of larger trees. It thus becomes an important factor in loss of quality in affected stems, and raises the risk of trunk breakage at attack points.

Year	Remarks
1971	Moderate to high-level damage noted at Sainte-Rita, Saint-Fabien, and Matapédia.
1976	Low level of infection at Saint-François-d'Assise.
1977	Light damage observed at Mann Settlement.
1981	85% of stems infected in a stand at Saint-François-d'Assise.

MAPLES

Specked tar spot, *Rhytisma punctatum* (Pers.) Fr.

This is a disease of maple foliage that appears only occasionally. It never causes significant damage.

Year	Remarks
1967	Low to moderate infection on sugar maple in Bonaventure CD.
1977	25% of mountain maple foliage infected over 4 ha at Marsoui and a similar proportion of striped maple foliage infected over 2 ha near Capucins.
1978	Moderate infection found on mountain maple at Matapédia. Other lower-level infections noted over 2 ha of sugar maple at Capucins, and over 4 ha of mountain maple at Grosses-Roches.
1987	Disease noted on 100% of the mountain maples in the Ristigouche Ecological Reserve.

MAPLES

ORGANISM	YEAR	HOST	REMARKS
Powdery mildew *Uncinula circinata* Cooke & Peck	1977	MOM.	Low level of infection over 1 ha near Saint-Charles-Garnier.
	1978	MOM, RM.	15 to 60% of foliage infected in certain stands in Bonaventure, Gaspé-Est and Rimouski CDs.
Tar spot *Rhytisma acerinum* (Pers.) Fr.	1967	RM.	High levels of infection near La Pocatière.
	1975	RM.	Low levels of infection at Saint-Jogues.
	1979	RM.	20% of foliage affected over 1 ha at Saint-Gabriel (Rimouski).
Wind breakage	1979	SM.	Crown foliage half shredded near Saint-Jean-de-la-Lande.

MAPLES

Partial list of other diseases
and pathogenic agents
encountered in the region

English name	Latin name	Preferred host(s)
Anthracnose	*Kabatiella apocrypta* (E. & E.)	SM, MOM.
Leaf spot	*Phyllosticta minima* (B. & C.) Underw. & Earle	SM, MOM.
Nectria dieback	*Nectria cinnabarina* (Tode: Fr.) Fr.	WB, YB, SM.

MOUNTAIN-ASHES

INSECTS

Mountain-ash sawfly, *Pristiphora geniculata* (Htg.)

Damage to forests by colonies of these sawflies has no economic significance, but on ornamental mountain-ash trees they are a pest. In the last few years, the species seems to have been well controlled by the action of a European parasite typical to the species that was introduced into Quebec by Dr. F.W. Quednau of the Laurentian Forestry Centre.

Year	Remarks
1941	Severe defoliation in Témiscouata CD.
1943	Insect abundant from La Pocatière to Baie des Chaleurs.
1944	Major defoliation nearly everywhere in the region.
1954	Sawfly commonly found at Rivière-du-Loup.
1963	Severe defoliation at some sites in Kamouraska, Rivière-du-Loup, and Témiscouata CDs.
1964, 1967-1971	Levels ranging from trace to common observed several times in various areas.
1972	Population levels generally moderate to high in the Gaspé.
1973	Common throughout Region 01.
1974	Areas with light to severe defoliation in the Gaspé.
1975	Severe defoliation at Grande-Vallée, moderate at Saint-Moïse and Wakeham [Ruisseau d'Argent], and light at several sites in Bonaventure and Matapédia CDs.
1976	Severe damage over a distance of 4 km near Pointe-à-la-Croix [Saint-Fidèle-de-Ristigouche, light at Saint-Damase and Saint-Vianney.
1977	Moderate to high populations at Manche-d'Épée and Gaspé. 40% defoliation over 11 km at Madeline-Centre and 15% defoliation over a few kilometres at Lac Cascapédia (Gaspé-Ouest), Saint-Yvon, and Saint-Cléophas. Traces only near Saint-Fidèle-de-Ristigouche.

MOUNTAIN-ASHES

1978	Defoliation moderate at Cap-Chat and light at Sainte-Paule.
1980	Light damage in the Matane Wildlife Reserve and at Cap-Chat.
1981	Low population levels.
1982	60% defoliation locally at Matane and Saint-Moïse.

MOUNTAIN-ASHES

Partial list of other insects encountered in the region

English name	Latin name	Preferred host(s)
Pepper-and-salt moth	*Biston betularia cognataria* (Gn.)	WB, DEC, TA, WI, MO.

MOUNTAIN-ASHES

DISEASES

ORGANISM	YEAR	HOST	REMARKS
Fire blight *Erwinia amylovora* (Burr.) Winsl. et al.	1976	MO.	Mortality of many ornamental trees in the La Pocatière area.

MOUNTAIN-ASHES

Partial list of other diseases and pathogenic agents encountered in the region

English name	Latin name	Preferred host(s)
Leaf rust	*Gymnosporangium cornutum* Arthur ex Kern	MO.

POPLARS

INSECTS

Aspen petiole leafroller, *Ectoedemia argyropeza downesi* W. & S.

This insect has little effect on trembling aspen even when it attacks a large percentage of the leaves.

Year	Remarks
1967	Several sites with moderate to severe infestations: between Matapédia and the bay of Gaspé, Sainte-Anne-des-Monts, southwest of Cap-Chat [Saint-Octave-de-l'Avenir], and at Les Méchins [Saint- Paul-Dalibaire].
1968	High infestation levels in Témiscouata and Rimouski CDs.
1973	Populations ranging from trace to high throughout Region 01.
1974	Upsurge in populations, generally moderate or high numbers, especially on the north shore of the Gaspé Peninsula, from Rimouski to Gaspé and in Bonaventure CD.
1975	Populations generally moderate to high on the north side of the Gaspé and trace to moderate on the south side.
1976	Similar situation on the north side of the peninsula. Also, moderate populations at Saint-Marc-du-Lac-Long [Les Étroits] and at New Richmond.
1977	Level of infestation unchanged at Saint-Marc-du-Lac-Long [Les Étroits] and low at Saint-Alexis-de-Matapédia.
1978	Insect no longer sampled, starting in this year.

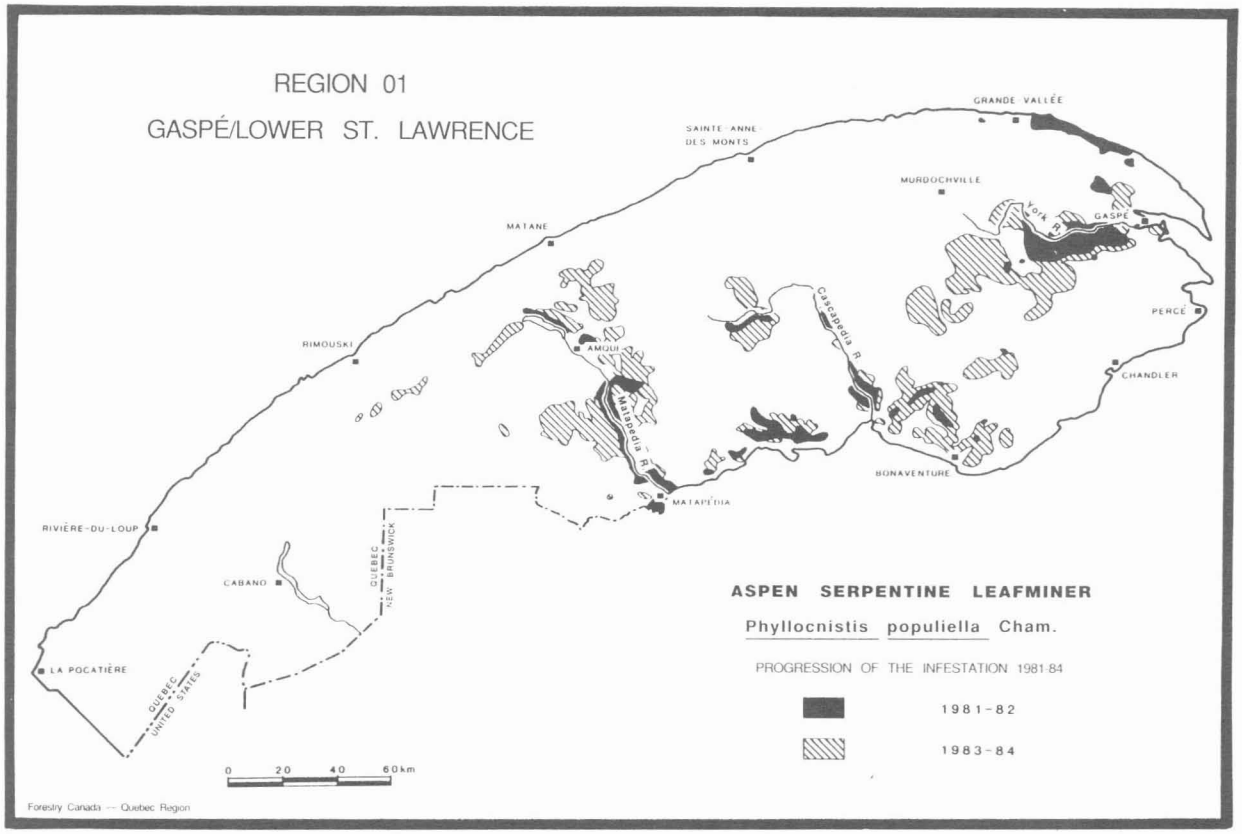
POPLARS

Aspen serpentine leafminer, *Phyllocnistis populiella* Cham.

This leafminer infested poplar stands in wide areas of the Gaspé in the early 1980s. However, since leaves are only partially attacked, damage to trees is limited and there is little growth reduction.

Year	Remarks
1966	Sampled at Mont-Joli and at Sainte-Jeanne-d'Arc.
1967	Low population levels on balsam poplars at Sainte-Angèle-de-Mérici (Rimouski).
1968-1974	Levels trace to low.
1975	Low population levels on hybrid poplars west of the Matane Wildlife Reserve and on eastern cottonwood near Amqui.
1976	Level of infestation unchanged at Amqui; light damage at the Caplan forestry farm.
1977	Low infestation on balsam poplar near Amqui.
1978	Moderate damage over 40 km^2 west of Wakeham and locally southwest of Amqui on trembling aspen.
1979	Increase in populations with new pockets of low to high-level infestation in the basins of the Dartmouth, York, and Saint-Jean rivers (Gaspé-Est). Low levels at Petite-Vallée, L'Alverne, Causapscal, and along the Square Forks River (Matapédia).
1980	General increase in populations: high-level infestations from Wakeham and 22 km to the west. High populations at Grande-Vallée, Saint-Yvon [Grand-Étang], Esuminac, Saint-Jean-de-Matapédia, and Causapscal.
1981	The total area of trembling aspen infested was 476 km^2. The main center of low- to high-level infestation extended over 364 km^2 around Lac Baillargeon (Gaspé-Est). A second center, covering 36 km^2, was located in the central basin of the Dartmouth River (Gaspé-Est). Eight other centers, totalling 76 km^2, were scattered across Matapédia and Bonaventure CDs.
1982	The infested area rose to 935 km^2; the outbreak became general throughout the peninsula except in the area of the Dartmouth River (Gaspé-Est) where regression occurred.
1983	The infested area tripled to 2 440 km^2; the greatest expansion was between Sayabec and Saint-Narcisse-de-Rimouski [Fond d'Ormes].

POPLARS



1984 Regression of the outbreak in both area and intensity: total of 1 794 km^2 infested. Some centers completely disappeared such as the one on the Ristigouche River (Bonaventure) at Carleton, between Petite-Vallée and L'Anse-à-Valleau, and the one on the Neigette River (Rimouski). The center on the Dartmouth river (Gaspé-Est) declined from moderate/high to light. New pockets appeared in the basins of the Bonaventure and Bonaventure Ouest rivers (Bonaventure), and on the Saint-Jean and Saint-Jean Ouest rivers in Gaspé-Est CD (see map above).

1985 Infested area roughly the same as the previous year (1 990 km^2). Decrease in areas of high-level infestation from 673 km^2 to 118 km^2. The insect remained widespread in the basins of the Matapédia and Bonaventure rivers (Bonaventure).

1986 Major decline in the infestation with only one area of moderate intensity located between Matapédia and New Richmond. Elsewhere, damage was light.

1987 Local increase in populations. Moderate and severe damage observed at various areas in the basins of the Saint-Jean, Dartmouth, and York rivers (Gaspé-Est), and in the Matapédia valley.

POPLARS

Bruce spanworm, *Operophtera bruceata* (Hulst)

This spanworm can cause severe defoliation in trembling aspen and sugar maple stands. Its outbreaks are of short duration because of a viral disease that controls this insect (see also **MAPLES**).

Year	Remarks
1973	Moderate to severe defoliation in large stands over a distance of 16 km between Rivière-Bleue and the New Brunswick border.
1974	Expansion of the above outbreak: now including the localities of Packington [Saint-Benoît-Abbé] and Saint-Jean-de-la-Lande.
1975	Collapse of populations.
1976-1980	Population endemic.
1981	Moderate population levels at Sainte-Angèle-de-Mérici.
1982	5 300 ha of severe defoliation east of Les-Hauteurs-de-Rimouski and Saint-Charles-Garnier, bounded on the west by 200 ha of moderate defoliation and on the northeast by 280 ha of light defoliation.
1983	Considerable expansion of the outbreak with a total of 1 240 km² infested. Most of the moderate and severe damage occurred in Témiscouata and Rivière-du-Loup CDs (see map, page 114).
1984	The affected area decreased significantly to a total of 357 km². The most heavily affected areas were located south of Lac Témiscouata and Lac Pohénégamook and around Lac Long (Témiscouata).
1985	No significant damage reported.

POPLARS

Cherry casebearer, *Coleophora pruniella* Clem.

This casebearer caused browning on foliage in some trembling aspen stands in Administrative Region 01 a few years ago. Damage to the trees was minimal.

Year	Remarks
1977	First known outbreak in Quebec. Trembling aspen stands affected to a moderate/high level over about 40 ha near Amqui, Sainte-Angèle-de-Mérici, Saint-Léon-le-Grand, and Lac-Humqui. Also, 15% defoliation in a small lot of balsam poplar at Saint-Angèle-de-Mérici.
1978	Slight decline in the severity of attack and in the area affected by comparison to the previous year. Light defoliation on balsam poplar at Matane.
1979	Centers of light to moderate defoliation covering 32 ha of trembling aspen at Amqui and 0.1 to 5 ha at Sainte-Angèle-de-Mérici, Val-Brillant, Sayabec, Lac-Humqui, and Saint-Léon-le-Grand.
1980	95% browning of balsam poplar foliage over 5.5 ha at Sayabec. Increased damage on trembling aspen; 60 to 90% browning in several small woodlots between Sainte-Angèle-de-Mérici and Lac-Humqui via Amqui..
1981	Disappearance of all the centers of infestation that existed the previous year. New center west of Sainte-Angèle-de-Mérici with high population levels on trembling aspen.
1982	At Sainte-Angèle-de-Mérici, decrease in the level of infestation; trace to light over 2 ha.
1983	Traces only.

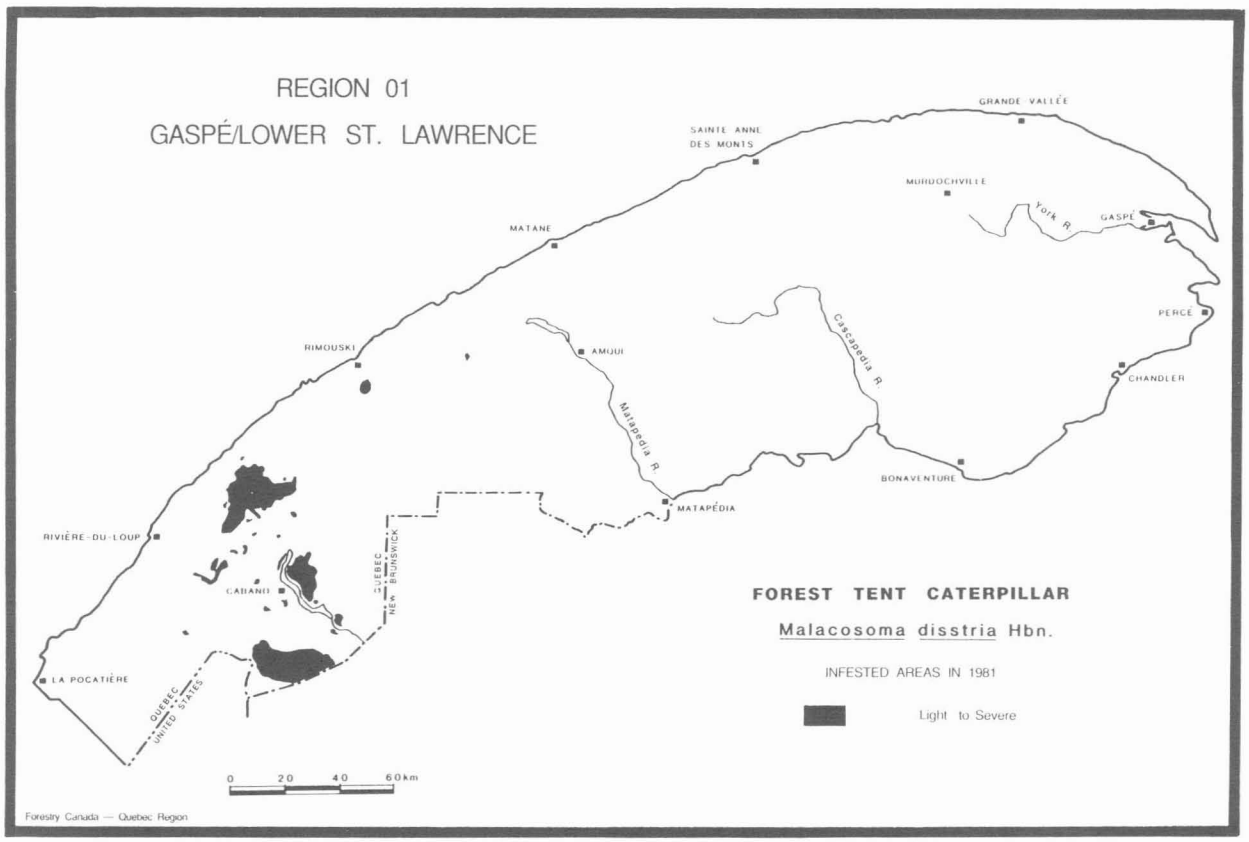
POPLARS

Forest tent caterpillar, *Malacosoma disstria* Hbn.

This tent caterpillar periodically defoliates trembling aspen stands, mainly bringing about reduced tree growth. It can also attack maple stands, and possibly cause dieback. Natural factors such as parasitism curb its populations after a few years.

Year	Remarks
1941	Some trees completely defoliated in Duquesne canton (Rimouski).
1944	Epidemic in certain stands east of Saint-Alexandre (Kamouraska).
1945	Disappearance of the epidemic.
1951	A few limited pockets of moderate-level infestation at Rivière-Bleue.
1952	Moderate infestations at Rivière-Bleue and Rimouski, light at Matane and Rivière-du-Loup.
1953	Light infestations scattered throughout the region except in Gaspé-Ouest CD.
1954	Pocket of moderate to high-level infestation at Lac Témiscouata.
1964-1978	Occasional harvests. Population endemic.
1979	Light to moderate defoliation between Saint-Marc-du-Lac-Long [Les Étroits] and Saint-Jean-de-la-Lande. Moderate damage at Sainte-Angèle-de-Mérici over 0.5 ha, and over 3 ha at Sainte-Jeanne-d'Arc with light damage over more than 5 km^2 near the latter locality.
1980	Upsurge in populations affecting nearly all of Témiscouata and Rivière-du-Loup CDs and the northern parts of Rimouski and Matapédia CDs. The most severe defoliation observed between Saint-Marc-du-Lac-Long [Les Étroits] and Saint-Jean-de-la-Lande, between Saint-Eugène-de-Ladrière and Sainte-Angèle-de-Mérici, and in the Sainte-Jeanne-d'Arc area.
1981	The epidemic continued; four main centers of severe defoliation covering 800 km^2 in Rivière-du-Loup and Témiscouata CDs (see map, page 137). In Rimouski CD, 160 km^2 affected, especially southwest of Sainte-Blandine and south of Sainte-Angèle-de-Mérici.

POPLARS



1982 Major decrease in populations; damage severe over 162 ha, moderate over 3 442 ha and light over 2 268 ha south of Sainte-Blandine and Sainte-Angèle-de-Mérici. Light defoliation over 5 600 ha at Saint-Éleuthère, over 3 600 ha at Saint-Marc-du-Lac-Long [Les Étroits], and over 1 100 ha at Saint-Juste-du-Lac where there was also moderate defoliation over 3 100 ha.

1983 Nearly total collapse of populations.

POPLARS

Large aspen tortrix, *Choristoneura conflictana* (Wlk.)

Defoliation by this tortrix, which mainly attacks trembling aspen, is rarely total and does not lead to tree mortality.

Year	Remarks
1951	Severe defoliation at Rivière-Bleue in association with the **forest tent caterpillar**. First mention of damage in the region.
1968	Traces.
1969	Light defoliation on a strip 30 km wide and 160 km long adjoining the St. Lawrence River in Rimouski, Matane, and Matapédia CDs.
1970	Small numbers harvested in Témiscouata CD.
1971	Centers of moderate to high-level infestation covering up to several square kilometres in Rivière-du-Loup CD.
1972	The centers observed in 1971 remained at the same level of severity, but expanded into Kamouraska, Témiscouata, Rimouski, and Matapédia CDs. New area of infestation 13 km^2 west of Gaspé.
1973	General decline in populations. Moderate and severe defoliation at Trois-Pistoles, Saint-Simon, and Lac-au-Saumon only.
1974	Low-level infestations at Val-Brillant and Capucins [Baie-des- Capucins] and east of Murdochville.
1975	Increase in severity; levels high at Saint-Eugène-de-Ladrière, moderate at Bic and Saint-Antonin [Rivière-Verte], and low at Capucins [Baie-des-Capucins] and Saint-Jean-de-Dieu.
1976	Moderate residual pocket at Saint-Antonin [Rivière-Verte]. Same level of defoliation at Wakeham over a distance of 8 km; light defoliation at Capucins (25 km^2) and Bic (2.6 km^2). Low levels of infestation at New Carlisle.
1977	Nearly total collapse of populations; a single spot of light defoliation at Lac-Humqui.
1978	Population endemic.
1979	At Routhierville, defoliation moderate over 10 ha and light over a distance of 16 km.

POPLARS

1980	Population levels moderate at Amqui and low at Lac-Humqui.
1981-1983	Traces only.
1985	100 ha moderately defoliated 6 km east of Capucins. Increase in populations in Kamouraska and Rivière-du-Loup CDs where the insect was common.

POPLARS

Poplar petiolegall moth, *Ectoedemia populella* Busk.

This insect damages the petioles of trembling aspen. Although substantial at times, the damage is not very harmful to trees.

Year	Remarks
1969	Sampled at Lac des Aigles (Rimouski).
1972	Trace levels.
1977	Low population levels at Saint-Alexandre-des-Lacs.
1978	18% of petioles affected at a site 10 km northeast of Saint-Damase.
1979	Galls present on 40% of petioles at Sainte-Angèle-de-Mérici, on 30% at Sayabec and on 20% at Grande-Cascapédia.
1980	Several attacks with 10 to 60% of petioles infested in the northeastern part of Rimouski CD and in the northern part of Matapédia CD.
1981	Moderate population levels at Saint-Alexandre-des-Lacs, low levels at Sainte-Blandine.

POPLARS

Satin moth, *Leucoma salicis* (L.)

In general, this insect defoliates ornamental willows and poplars. Occasionally, trembling aspen stands may be affected as well. Large populations of this insect are usually quickly curbed by natural factors.

Year	Remarks
1941	Severe infestations at Chandler and Gaspé.
1947	Significant defoliation of poplars throughout the Baie des Chaleurs area, particularly at Percé.
1948	Moderate defoliation at Caplan, Bonaventure, and New Carlisle.
1949	Recurring infestation at the above sites and beginnings of an infestation at Cacouna.
1950	The previous year's areas of infestation remained stable except between Cacouna and Kamouraska where ornamental poplars were severely damaged.
1951	Pockets of infestation disappearing.
1952	Residual population at Saint-André (Kamouraska).
1953	Situation similar to 1952. Also, pockets of infestation at Rivière-du-Loup and Percé.
1963	Localized infestation in Rimouski CD.
1968	Severe defoliation on eastern cottonwood, Lombardy poplar, and willow at Luceville and Sainte-Flavie.
1969	Occasional occurrence.
1970-1973	Not reported.
1974	Severe local defoliation at Saint-Majorique [Pointe-Navarre] and at Gaspé, moderate defoliation on balsam, Lombardy, and silver poplars at Carleton.
1975	Severe damage on Lombardy poplar at Saint-Majorique [Pointe-Navarre] and Gaspé. Severe defoliation on balsam poplar at Grande-Vallée, light on silver poplar at Saint-Omer and on Lombardy poplar at Carleton.
1976	Light to moderate defoliation at Grande-Vallée and Carleton.
1977	Traces.
1979	Severe damage on a few balsam poplars and on 25 trembling aspen in a 0.5-ha stand at Saint-François-d'Assise.

POPLARS

1980	Moderate local defoliations on a few silver poplar at Hope Town and Port-Daniel; also a few poplar sp. 90% defoliated at Saint-Simon.
1981	Limited high-level infestations in the Bic Conservation Park [Cap-à-l'Orignal], Caplan, and Bonaventure; moderate infestation at Maria.
1982	Silver poplar 90% defoliated at Port-Daniel; poplar sp. 100% defoliated at Nouvelle and 60% defoliated at Saint-François-d'Assise; a few ornamental willows 50% defoliated at Amqui.
1983	Rare mention in Quebec of a major infestation on trembling aspen in a natural forest. Total defoliation over 1 260 ha in five well defined areas on the York River and in another area on the Saint-Jean River (Gaspé-Est).

POPLARS

INSECT	YEAR	HOST	REMARKS
American aspen beetle *Gonioctena americana* (Schaeff.)	1969	TA.	Low population levels at Saint-Jean-de-Dieu.
Aspen leafroller *Pseudexentera oregonana* (Wlsm.)	1965	TA.	Moderate population levels near Lac-au-Saumon.
	1978	TA.	Low population levels at Saint-Omer.
	1980	TA.	Moderate defoliation (as high as 50%) along 10 km of highway in the Boucherville area.
	1981	TA.	Decline of the infestation at Routhierville; 20% defoliation over 20 ha.
Aspen twoleaf tier *Enargia decolor* (Wlk.)	1968 1983	BPO, HPO, TA.	Commonly found during this period.
False Bruce spanworm *Itame loricaria* (Evers.)	1973, 1974	TA.	Very common at Saint-Marc-du-Lac-Long [Les Étroits].
Ghost moth *Sthenopis quadriguttatus* (Grt.)	1977	PO.	30% of the stems in a six-year-old plantation at Matane attacked by this root insect.
Lesser aspen webworm *Meroptera pravella* (Grt.)	1980	TA.	Low population levels at Mont-Joli.
	1981	TA.	10% of foliage affected south of Saint-Narcisse-de-Rimouski.

POPLARS

INSECT	YEAR	HOST	REMARKS
Lombardy leafminer *Paraphytomyza populicola* (Wlk.)	1971	ECO.	Level of infestation high at Mont-Joli and moderate at Saint-Alexandre, Saint-Moïse, Saint-Simon, and Trois-Pistoles; occurring on windbreaks.
		LPO.	Infestation moderate at Escuminac, low east of La Pocatière.
	1975	ECO.	Low population levels east of Amqui and at Causapscal.
		LPO.	Low population levels at Causapscal.
	1976	ECO.	24% of leaves mined at Black Cape.
		LPO.	44% of leaves mined at Grande-Cascapédia.
Poplar-and-willow borer *Cryptorhynchus lapathi* (L.)	1943	PO.	Severe damage in a young plantation on the Iles-de-la-Madeleine.
	1975	HPO.	Moderate damage northwest of Sully and light damage at New Richmond.
	1976	HPO.	Low population levels at Cabano.
Poplar borer *Saperda calcarata* Say	1964, 1974, 1978, 1980	PO, WI.	Attacks on trunks and branches; occurrence common throughout the area of distribution of poplars.
Poplar budgall mite *Aceria parapopuli* Keif.	1977	TA.	Moderate damage on about a hundred trees at Sainte-Angèle-de-Mérici.

POPLARS

INSECT	YEAR	HOST	REMARKS
Poplar edgefolding sawfly *Phyllocolpa popuella* (Ross.)	1975	ECO, WI.	Low population levels at Amqui and northwest of Saint-Elzéar (Bonaventure).
	1976	ECO.	Low population levels at Amqui.
	1977	BPO.	Low population levels at Sainte-Marguerite.
	1978	BPO.	Population levels still low at Sainte-Marguerite.
Poplar gall borer *Saperda populnea moesta* Lec.	1964, 1974, 1978, 1980	PO.	Attacks on trunks and branches; occurrence common throughout the area of distribution of poplars.
Poplar leaffolding sawfly *Phyllocolpa bozemani* (Cooley)	1941	PO.	Abundant at L'Isle-Verte.
Poplar leafminer *Phyllonorycter populiella* (Cham.)	1958	ECO, LTA, TA.	Insect abundant at Sainte-Anne-des-Monts.
	1977	TA.	Leaves lightly infested at Saint-André (Kamouraska).
Poplargall saperda *Saperda concolor* Lec.	1964, 1974, 1978, 1980	PO.	Attacks on trunks and branches; occurrence common throughout the area of distribution of poplars.
Spotted aspen leafroller *Pseudosciaphila duplex* (Wlsm.)	1970	LTA, TA.	Low population levels scattered throughout Administrative Region 01.
	1976	TA.	Frequent in the Lac Témiscouata area.

POPLARS

Partial list of other insects encountered in the region

English name	Latin name	Preferred host(s)
Alder dagger moth	*Acronicta dactylina* Grt.	AL, WI, TA, PCH, BPO.
Birch-aspen leafroller	*Epinotia solandriana* (L.)	TA, BPO, WB.
Blackcheeked aspen caterpillar	*Ipimorpha pleonectusa* Grt.	TA, RM.
Canadian tiger swallowtail	*Papilio glaucus canadensis* R. & J.	TA, BPO, PCH, DEC.
Darkheaded aspen leafroller	*Anacampsis innocuella* (Zell.)	TA, PO.
Dusky leafroller	*Orthotaenia undulana* (D. & S.)	SM, TA, RM, BPO, DEC.
Elm sawfly	*Cimbex americana* Leach	WB, TA, WI, DEC.
False hornworm	*Pheosia rimosa* Pack.	TA, WI.
Green aspen leaftier	*Pandemis canadana* Kft.	TA, YB, WB, WI, WE, AL, SM.
Grieving woodling	*Egira dolosa* (Grt.)	TA.
Hairy poplar sawfly	*Trichiocampus viminalis* (Fall.)	ECO, TA, PO.
Large false looper	*Zale minerea norda* (Sm.)	TA, M, DEC.
Large willow sawfly	*Trichiosoma triangulum* Kby.	WI, TA, BPO, BAS, AL.
Lesser maple spanworm	*Itame pustularia* (Gn.)	M, TA.
Noctuid moth	*Lithophane innominata* (Smith)	SM, TA, WB, WAS, DEC.
Pale green notodontid	*Gluphisia septentrionis* Wlk.	TA, BPO, AL, DEC.
Paleheaded aspen leafroller	*Anacampsis niveopulvella* (Cham.)	TA.
Pepper-and-salt moth	*Biston betularia cognataria* (Gn.)	WB, TA, WI, DEC, MO.

POPLARS

Poplar catkin moth	*Anathix puta* (G. & R.)	TA.
Poplar leafmining sawfly	*Messa populifoliella* (Towns.)	TA.
Poplar leaftier	*Nycteola cinereana* N. & D.	PO, BPO, ECO.
Poplar vagabond aphid	*Mordwilkoja vagabunda* (Walsh)	TA.
Rustylined leaftier	*Clostera albosigma* Fitch	TA, WI.
Saddleback looper	*Ectropis crepuscularia* (D. & S.)	BF, TL, WS, SM, TA, CON, DEC.
Spotted poplar aphid.	*Aphis maculatae* Oestl.	PO.
Twinspot sphinx	*Smerinthus jamaicensis* (Dru.)	PO, WI.
Variable caterpillar	*Pyrrhia exprimens* (Wlk.)	PO.
Viceroy	*Basilarchia archippus* (Cram.)	PO, DEC.
Yellowheaded aspen leaftier	*Epinotia nisella* (Cl.)	TA.

N.B. Certain species are polyphagous, attacking both coniferous and deciduous trees.

POPLARS

DISEASES

Ceratocystis canker, *Ceratocystis fimbriata* Ellis & Halst.

This canker, which is common on trembling aspen in some places, has a target shape very similar to that of the **Nectria canker**. Although only identified for the first time in this region in 1976, this disease surely existed here earlier. The levels of infection for a stand are always cumulative values as the cankers are persistent.

Year	Remarks
1976	22% of stems affected at Grosses-Roches, 28% at Sainte-Paule.
1977	42% of trees affected at Sainte-Jeanne-d'Arc and 25% at Biencourt [La Nativité]. Other infections in the order of 4 to 8% of trunks reported at Sainte-Paule, Sayabec, and Causapscal.
1978	At Cap-Seize, 36% of trees showed an average of four cankers per tree while at Grosses-Roches, 28% of trunks had an average of five cankers each. Other infections, ranging from trace to high, were detected at several sites in the region.
1979	At Saint-Godefroi, 76% of trees had an average of three cankers each and close to half of the trees were dead.
1980	Infection levels moderate at Sayabec and Forillon National Park and low at Saint-Eugène-de-Ladrière.
1981	A special survey carried out at 62 different locations throughout Region 01 revealed that 3% of poplars had been attacked by this canker.
1982	Infection had reached 26% of stems near Les-Hauteurs-de-Rimouski and 40% near Saint-Jogues.
1983	40% of trees infected at Saint-Majorique and 30% at Saint-Jogues.

POPLARS

Hypoxylon canker, *Hypoxlyon mammatum* (Wahl.) J.H. Miller

This pathogen mainly affects trembling aspen, but largetooth aspen and balsam poplar are also among its victims. The cankers are characterized by bark mortality on the trunk that is at first yellow, then blackish, and eventually grayish when the fungus pathogen fructifies. The infection leads to the death of the tree within four to eight years. The canker is particularly abundant in low-density woodlots in farming areas, but may be encountered anywhere.

Year	Remarks
1966	Low to moderate infection levels detected at New Carlisle.
1972	Moderate to severe damage (followed by mortality) detected in Kamouraska and Matapédia CDs.
1973	Light damage found in Bonventure and Kamouraska CDs.
1974	Of 35 stands observed on the peninsula, 17 showed moderate infection levels; 11 showed light levels; and 7 showed traces.
1975	Multiple pockets of moderate-level infection throughout Region 01.
1976	Six of 46 sites surveyed had cankers on more than 26% of trees, 18 sites had cankers on 6 to 25% of trees, and 15 had them on 2 to 5%; at 7 sites, fewer than 2% of trees were affected.
1977	Moderate infections near Sainte-Jeanne-d'Arc, Causapscal, and Chandler.
1978	20% of trees infected near Chandler. Between 4 and 10% of stems affected at Saint-Gabriel-Lalemant [Saint-Gabriel-de-Kamouraska], Grosses-Roches, and Cap-Seize.
1981	An inventory to assess the local effects of the disease was carried out in the Grand-Portage management unit by a researcher at the Laurentian Forestry Centre. In 82 stands inspected (2 460 stems), 4.1% of stems were diseased or dead (2.8% of the volume). In addition, a special FIDS survey throughout Region 01 confirmed the above figures with 4.5% infection and mortality among the 1 540 subjects studied.
1982	16% of stems affected near Les-Hauteurs-de-Rimouski and Capucins. Near Saint-Eugène-de-Ladrière and at L'Anse-au-Griffon, the levels of infection remained low.
1983	30% of trees affected at Saint-Jogues.

POPLARS

Ink spot, *Ciborinia whetzelii* (Seaver) Seaver

This pathogen can affect nearly all poplars, but it is commonly found on trembling aspen. It first produces circular or ellipsoidal spots on the leaves which subsequently turn brown but remain attached to the branch. The fungus produces a black circular sclerotium which eventually becomes detached from the leaf leaving a typical circular hole in it. Infections in stands are highly variable from one place and year to another, but may be very severe.

Year	Remarks
1961	Up to 80% of foliage of trembling aspen affected at Rivière-Bleue, Sainte-Florence, Cap-Seize, and Mont Berry (Matapédia).
1962	Moderate to high infections in Témiscouata CD, and on Lombardy poplar at Amqui.
1964	More than 85% of the leaves of trembling aspen affected near Murdochville; similar infections on Lombardy poplar reported at Rimouski, Saint-Moïse, and Escuminac.
1966	Low to moderate levels of infection near Rimouski and Gaspé.
1968	Disease observed on trees of all ages and at various levels at several sites scattered through Region 01.
1970	Moderate to severe browning of foliage near Saint-Pacôme, Saint- Gabriel-Lalemant (Saint-Gabriel-de-Kamouraska), and Mont-Carmel.
1971	Trees moderately browned over 200 ha at Lac de l'Est (Kamouraska).
1972	Several cases of severe damage observed in Matapédia, Matane, and Gaspé-Est CDs.
1973	Moderate to high levels of severity on trembling aspen in about thirty scattered pockets of infection east of Rivière-du-Loup. Symptoms also observed on a few hybrid poplar in the poplar arboretums at Cabano and Matane.
1974	Major decline in the severity of the disease. However, some moderate damage still reported in Rivière-du-Loup, Rimouski, Matane, and Matapédia CDs.
1975	Numerous cases of low- to moderate-level infection observed at sites near Lac de l'Est (Kamouraska), Lac Témiscouata, Saint-Léon-le-Grand, and Routhierville.
1976	The intensity and severity of the disease declined appreciably from 1975 levels except in Kamouraska and Témiscouata CDs where infections were low to moderate.

POPLARS

1977 Infection levels similar to those in 1976 in Kamouraska and Témiscouata CDs. Other light damage noted at Sainte-Anne-des-Monts, Sayabec, Saint-René-de-Matane, Sainte-Paule, and southeast of Murdochville.

1978 Moderate infections observed 70 km northwest of Grande-Cascapédia and over 5 ha at Cap-Chat. Others, at low levels, covered 50 km² at Saint-Jean-de-Cherbourg, 25 km² at Cap-Seize and 3 km² at Saint-René-de-Matane. Finally, small pockets of low-level infection were observed near Sainte-Marguerite and in Kamouraska and Témiscouata CDs.

1979 15% of foliage affected over a distance of 11 km near Sainte-Anne-des-Monts.

1980 From 5 to 50% of foliage infected nearly everywhere in Region 01.

1981 High levels of infection over 250 ha in the Cap-Chat Wildlife Reserve and over 30 ha northwest of New Richmond. Moderate levels between Sainte-Anne-des-Monts and Le Gîte-du-Mont-Albert (130 ha), in the Matane Wildlife Reserve (130 ha), and at New Carlisle (2.5 ha). Apart from these centers, other smaller areas were reported: near Saint-Simon and Saint-Damase (high level); Saint-Jean-de-la-Lande, Trois-Pistoles, Trinité-des-Monts, and La Rédemption (moderate level); Petite-Vallée and in the Rimouski Wildlife Reserve (low level of severity).

1982 Nearly complete disappearance of the disease. Only one small pocket of low intensity was observed: south of Sainte-Anne-des-Monts.

1983 Only a few hectares of moderate infection visible between Gaspé and Murdochville. Other low-level damage found south of Sainte-Anne-des-Monts, in the Cap-Chat Wildlife Reserve, and at Saint-Simon, Cloridorme, and Rivière-la-Madeleine.

1984 Moderate infection northeast of Matane.

POPLARS

Leaf blight, *Linospora tetraspora* G. Thompson

This foliar disease occurs in late summer on balsam poplar. The degree of abundance varies greatly from one year to the next; in most cases, it is limited to small areas of regeneration or young stands.

Year	Remarks
1961	First high-level infection reported near Saint-Marc-du-Lac-Long [Glendyne].
1964	High infection levels noted in the Gaspé Conservation Park.
1967	Low-level infections near Matapédia and at Lac de l'Est (Kamouraska).
1977	Low-level infection observed in Kamouraska CD.
1978	30 to 95% of foliage affected on the Lac Pohénégamook road (Kamouraska).
1979	Less than 40% of foliage infected locally in Kamouraska CD and northeast of Grande-Cascapédia.
1980	Several infections ranging from low to high levels in the areas of Pohénégamook, Dégelis [Sainte-Rose-du-Dégelis], Rimouski, Cap-Chat, Escuminac, Saint-Omer, and Wakeham.
1981	Moderate to high levels over 20 ha near Amqui, over 2 ha near Nouvelle, and locally near New Richmond and Saint-Edgar.
1983	60% of foliage affected northeast of Saint-Edgar.

POPLARS

Leaf rust, *Melampsora medusae* Thuemen

This fungus causes a rust on the foliage of trembling aspen and occasionally on other poplars. It is easily recognized in September and October, when it produces orange fructifications under the leaves. Heavy infection may lead to an appreciable reduction in tree growth and early leaf drop. The fungus completes its life cycle on larch, to which it does not do any appreciable harm.

Year	Remarks
1965	Rust abundant on trembling aspen along the York River (Gaspé-Est).
1966	Low- to moderate-level infections noted at the Parke Forestry Training Center, southeast of Saint-Pacôme, and at New Carlisle.
1967	Moderate- to high-level infections on trembling aspen in the Chandler area.
1969	Infection moderate to high in intensity on trembling aspen between La Pocatière and Sainte-Anne-des-Monts.
1972	Several infections seen on largetooth and trembling aspen in Matapédia, Matane, and Bonaventure CDs.
1973	Up to 90% of foliage affected on trembling aspen near Chandler and Pabos. Other infections, ranging in intensity from low to moderate, were also reported on the peninsula.
1974	Pockets of infection on trembling aspen affecting from 25 to 60% of foliage were visible between Rivière-du-Loup and Matane. Moderate damage on tamarack observed at Saint-Alexandre.
1975	Low levels of infection on trembling aspen at Causapscal and Grand-Pabos.
1976	35% of foliage affected in a trembling aspen stand in the Rimouski Wildlife Reserve; 12% of foliage affected over 2 to 3 ha at Saint-Charles-Garnier and Sainte-Jeanne-d'Arc. Also, moderate infection on largetooth aspen reported in the Matane Wildlife Reserve.
1977	Several moderate infections covering 1 ha or less of trembling aspen at Lac Matane (Matane), Murdochville, Saint-Léon-le-Grand, and at a site 50 km northwest of Chandler.
1978	Between 25 and 80% of the leaves of hybrid poplar infected north of Nouvelle. Infections on trembling aspen detected over 1 to 6 ha at different levels of severity:

high at Saint-Jean-de-Cherbourg; moderate near Amqui, Saint-Damase, north of Pabos, and at a site 50 km northwest of Chandler; low at Grosses-Roches.

1979 On hybrid poplar, levels of infection ranging from 15 to 80% of foliage in Témiscouata CD. On trembling aspen, levels low near Lac Rimouski (Rimouski) and at Saint-Majorique.

1980 Between 8 and 30% of leaves of hybrid poplar infected in the poplar arboretum at Sully and in the Lake Dole Reserve (Témiscouata). Other low-level infections at Sayabec, Price, Grand-Métis, and Saint-Octave-de-Métis.

1981 Moderate- to high-level infections on trembling aspen observed near Nouvelle, Saint-Donat, and La Rédemption. Low infection levels on all hybrid poplars in a poplar arboretum at New Richmond.

POPLARS

Powdery mildew, *Uncinula adunca* (Wallr.: Fr.) Lév.

This foliar disease can be recognized by the layer of white mycelium present at the surface of the lamina (blade), particularly on leaves exposed to a large amount of shadow and dampness. It causes premature defoliation. Though encountered mainly on balsam poplar, it sometimes becomes abundant locally on saplings and in young stands.

Year	Remarks
1966	Spots showing a high degree of infection found at Matapédia and at the Parke Forestry Training Center.
1967	Disease common in the CDs of Matapédia and Kamouraska.
1975	Moderate infection at Matapédia and other cases of lower-level infection visible at Saint-René-de-Matane [Ruisseau-Gagnon], Lac-Humqui, and south of Trinité-des-Monts [Lac des Échos].
1976-1977	Severe symptoms over 1 ha near Saint-Narcisse-de-Rimouski [Fond- d'Ormes].
1978	Moderate-level symptoms observed over a distance of 8 km near Amqui and over 1 ha at Saint-Narcisse-de-Rimouski [Fond-d'Ormes]. Light symptoms reported northwest of Grande-Cascapédia and at Lac-au-Saumon.
1979	Moderate infection over 5 ha at Rivière-la-Madéleine and over 1 ha at Saint-Narcisse-de-Rimouski [Fond-d'Ormes].
1980	Small areas affected to a moderate degree at Saint-Simon and to a low degree at the Rimouski Wildlife Reserve.
1981	20% of willow foliage infected at Saint-Gabriel (Rimouski).

POPLARS

Shoot blight, *Pollaccia radiosa* (Lib.) Baldacci & Cif.

This disease of foliage and annual shoots can affect several species of poplars, but it has been observed in abundance only on trembling aspen. It is characterized by browning followed by rapid blackening of the leaves and young shoots in the growth phase.

Year	Remarks
1962	Severe damage reported over 8 ha near Rivière-Bleue.
1964	High levels of infection at Sainte-Anne-des-Monts.
1974	Numerous centers of low-level infection visible on the Gaspé Peninsula.
1975	Many weak infections in Region 01 particularly near Lac de l'Est (Kamouraska) and Lac Témiscouata, in the Gaspé Conservation Park, and at Coin-du-Banc (Gaspé-Est).
1976	High-level infections extending as far as 30 km around Gaspé.
1977-1978	Several reports of low infection levels from sites scattered throughout Region 01.

POPLARS

ORGANISM	YEAR	HOST	REMARKS
Cytospora canker	1974	TA.	Moderate infection at Saint-Mathieu.
Leucostoma nivea (Hoffm.:Fr.) Hoehmel	1981	TA.	10% of trunks infected at Saint-Alexandre-des-Lacs.
	1982	TA.	Low levels in a few stands in Forillon National Park.
Leaf spot	1964	TA.	Sampled at Matapédia.
Septoria populicola Peck			

POPLARS

Partial list of other diseases
and pathogenic agents
encountered in the region

English name	Latin name	Preferred host(s)
Dothichiza canker	*Cryptodiaporthe populea* (Sacc.) Butin	TA.
Leaf spot	*Marssonina populi* (Lib.) Magn.	TA, BPO.
Leaf spot	*Mycosphaerella populicola* G. Thompson	BPO.
Leaf spot	*Mycosphaerella populorum* G. Thompson	PO, BPO.
Leaf blister	*Taphrina populina* Fr.	PO.
Shoot blight	*Venturia populina* (Vuill.) Fabric.	BPO.

RED OAK

INSECTS

INSECT	YEAR	HOST	REMARKS
Oak leafshredder *Croesia semipurpurana* (Kft.)	1975	RO.	Low population levels at Pointe-à-la-Garde.
	1976	RO.	30% of foliage infested at L'Anse-aux-Griffons.
	1977	RO.	Population increased to a high level, causing 70% defoliation at Pointe-à-la-Garde.
	1978, 1979	RO.	70% stationary defoliation at Pointe-à-la-Garde and light defoliation at L'Anse-au-Griffon.

WHITE ELM

INSECTS

INSECT	YEAR	HOST	REMARKS
Elm leafminer *Fenusa ulmi* Sund.	1982	WE.	First mention of the insect in the region, low infestation levels near Saint-Modeste.
Native elm bark beetle *Hylurgopinus rufipes* (Eichh.)	1976	WE.	Populations at a moderate level south of Saint-Narcisse-de-Rimouski; first mention in the administrative region.
Smaller European elm bark beetle *Scolytus multistriatus* (Marsh.)	1976	WE.	The bark beetle, which is the main vector for **Dutch elm disease**, was captured in hormone traps at Rivière-Ouelle, which became the eastern limit of the known distribution of this insect in Quebec. First mention of it in the administrative region.
Woolly elm aphid *Eriosoma americanum* (Riley)	1940	WE.	Local epidemic at Saint-Éleuthère.
	1982	WE.	Low population levels at Rivière-du-Loup: 10% of foliage infested.

WHITE ELM

Partial list of other insects encountered in the region

English name	Latin name	Preferred host(s)
Elm spanworm	*Ennomos subsignaria* (Hbn.)	WE, SM, WI, BHA.
Green aspen leaftier	*Pandemis canadana* Kft.	TA, YB, WB, WI, WE, AL, SM.
Woolly apple aphid	*Eriosoma lanigerum* (Hausm.)	WE, APP.

WHITE ELM

DISEASES

Dutch elm disease, *Ceratocystis ulmi* (Buism.) C. Moreau

This disease is generally fatal when it appears on a tree. It was observed for the first time in Canada at Saint-Ours, Quebec, in 1944. The pathogen is carried from a diseased tree to a healthy one by a vector insect, either the **native elm bark beetle** (*Hylurgopinus rufipes* (Eichh.)), a native insect, or else by the **smaller European elm bark beetle** (*Scolytus multistriatus* (Marsh.)), an introduced insect. The disease is now found throughout Quebec.

Year	Remarks
1962	Disease reported for the first time in Region 01 near Restigouche and Rivière-Bleue.
1973	Trees killed by the disease discovered north of Grande-Cascapédia.
1976	A few isolated trees greatly affected near Saint-Narcisse-de-Rimouski [Fond-d'Ormes]. This discovery extended the known area of distribution of the disease 70 km northward.
1978	Infection detected at Sainte-Angèle-de-Mérici, 50 km east of the formerly known area of distribution.
1980	Some light damage in the municipality of Matapédia.
1982	At New Richmond, 4% of the trees had died of this disease in an urban setting while 69% of trees were affected (56% of them dead) in rural environments north of New Richmond and west of Restigouche.
1983	40% of elms affected by this pathogen at Saint-Pacôme and surrounding area.
1987	High levels of damage at New Richmond. At Saint-Pacôme, 65% of elms affected.

WILLOWS

INSECTS

INSECT	YEAR	HOST	REMARKS
Aspen skeletonizer *Phratora purpurea purpurea* Brown	1974	WI.	Low population levels at Amqui.
Hairy willow sawfly *Trichiocampus simplicicornis* (Nort.)	1967	WI.	Low population levels north of Sully.
	1973	WI.	Complete defoliation of one tree at New Richmond.
	1978	WI.	60% defoliation of a few trees near Lac-Humqui.
Imported willow leaf beetle *Plagiodera versicolora* (Laich.)	1974	WI.	Low population levels at Amqui.
Pacific willow leaf beetle *Pyrrhalta decora carbo* (Lec.)	1950	WI.	Severe damage along highways in Kamouraska and Témiscouata CDs. Also, light damage on poplar.
Sawfly *Nematus salicisodoratus* Dyar	1974	WI.	Light defoliation at Routhierville and at Saint-Edgar.
Willow redgall sawfly *Pontania proxima* (Lep.)	1977	WI.	60% of foliage infested on some large trees at Amqui.

WILLOWS

Partial list of other insects encountered in the region

English name	Latin name	Preferred host(s)
Alder dagger moth	*Acronicta dactylina* Grt.	AL, WI, TA, PCH, BPO.
Elm sawfly	*Cimbex americana* Leach	WB, TA, WI, DEC.
Elm spanworm	*Ennomos subsignaria* (Hbn.)	WE, SM, WI, BHA.
False hornworm	*Pheosia rimosa* Pack.	TA, WI.
Green aspen leaftier	*Pandemis canadana* Kft.	TA, YB, WB, WI, WE, AL, SM.
Large willow sawfly	*Trichiosoma triangulum* Kby.	WI, TA, BPO, BAS, AL.
Pepper-and-salt moth	*Biston betularia cognataria* (Gn.)	WB, TA, WI, DEC, MO.
Polyphemus moth	*Antheraea polyphemus polyphemus* (Cram.)	RM, WB, WI, DEC.
Rustylined leaftier	*Clostera albosigma* Fitch	TA, WI.
Twinspot sphinx	*Smerinthus jamaicensis* (Dru.)	PO, WI.
Willow potatogall midge	*Rhabdophaga salicisbatatas* (O.S.)	WI.

WILLOWS

DISEASES

Tar spot, *Rhytisma salicinum* (Pers.: Fr.) Fr.

This relatively common disease is considered insignificant mainly because it almost never affects all the foliage of a tree and also because of the limited economic importance of its host, the willow. The disease is widespread wherever willow grows in the region.

Year	Remarks
1967	Rather low level of infection in several localities throughout Region 01.
1974	Fewer than 25% of trees affected at Saint-Edgar and Mont Jacques-Cartier (Gaspé-Ouest).
1975	Increase in the disease with a moderate level observed in the Matane Wildlife Reserve and several pockets of infection east of the Rimouski River.
1976	25% of foliage infected at Pointe-à-la-Croix [Saint-Fidèle-de-Ristigouche] and over 1.6 km in the Matane Wildlife Reserve.
1977	At the Matane Wildlife Reserve, the infection continued. At Sainte-Paule, low-level infection visible on a few dozen trees.
1978	35% of foliage affected over a distance of 1.6 km in the Matane Wildlife Reserve.
1982	Infection on some 20% of foliage on trees along a highway northeast of Amqui.

WILLOWS

ORGANISM	YEAR	HOST	REMARKS
Black rib	1961	WI.	Found in the Gaspé Conservation Park.
Ciborinia foliicola (Cash & Davidson) Whet.	1974	WI.	5% of foliage affected at Saint-Alphonse [Sainte-Claire-de-Bonaventure].
	1977	WI.	Low-level infection over 1 ha at Murdochville and locally near Sainte-Marguerite.
Leaf rust	1974	WI.	Light symptoms in Matapédia and Gaspé-Est CDs.
Melampsora epitea Thuemen	1975	WI.	Low level of infection at Saint-Valérien.
	1976	WI.	Moderate level of infection east of Murdochville.
	1977	WI.	Decrease to low level of infection east of Murdochville.
	1978	WI.	Moderate infection levels at Maria and Saint-Omer, low levels at Restigouche and north of Pabos.
	1981	WI.	20% of foliage affected at Saint-Gabriel (Rimouski).
Willow scab	1973	WI.	Mortality reported on ornamental trees in Kamouraska and Rimouski CDs.
Pollaccia saliciperda (All. & Tub.) Arx	1975	WI.	Low infection levels at Cloridorme and Lac Bonjour (Matane).
	1976	WI.	Several low- and moderate-level infections near New Richmond and within a 30-km radius around Gaspé.

WILLOWS

ORGANISM	YEAR	HOST	REMARKS
	1977, 1978	WI.	Disappearance of symptoms at Gaspé. Low-level infection in Témiscouata CD.
	1980	WI.	20% of trees lightly affected at Capucins.

OTHER DECIDUOUS SPECIES

INSECTS

Fall webworm, *Hyphantria cunea* (Drury)

Populations of this webworm mainly affect trees that are on the edges of stands or in clumps. It can attack several different species of deciduous trees, particularly birch, ash, alder, willow, and cherry. Sometimes the crown of a tree is almost totally invaded by the tents of this insect.

Year	Remarks
1939	Moderate infestations from the western boundary of the administrative region to New Carlisle.
1941	Noticeable damage near Rimouski.
1946	Presence reported near Pabos.
1947	Very common along Baie des Chaleurs.
1950	Abundant throughout the region.
1960,	Found scattered throughout the region.
1964, 1967	Found scattered throughout the region.
1968	Main concentrations in Kamouraska and Rivière-du-Loup CDs. Also, moderate infestation near Saint-Fabien with 134 tents along 1.6 km of highway.
1969,	Traces only.
1970, 1973	Trace.
1974	As many as 190 tents observed along 1.6 km of highway at Maria [Dimock Creek]. Populations moderate near Bonaventure and Maria [Guité], low southeast of Saint-René-de-Matane [Rivière-Matane] and at Saint-Elzéar [Saint-Adélard] (Bonaventure).
1975	Decrease in population; levels low at Saint-Vianney, Sainte-Paule, Paspébiac, Maria, and Kelly.
1976	Moderate populations at Sainte-Paule and in the Matane Wildlife Reserve, low population levels near La Rédemption and Paspébiac.
1977	Population levels high at the western entrance of the Matane Wildlife Reserve and moderate at Sainte-Paule.
1978	Collapse of populations to trace levels.

OTHER DECIDUOUS SPECIES

Spiny elm caterpillar, *Nymphalis antiopa* (L.)

This gregarious insect causes no significant damage in the forest, but it can harm ornamental trees through defoliation. Its preferred hosts are elm, trembling aspen, and willow. The adult is the handsome mourningcloak butterfly.

Year	Remarks
1944	Common in the central part of Bonaventure CD.
1968	Traces only.
1974	Low population levels on balsam poplar at Saint-Fabien, Sainte-Florence, and Maria as well as on trembling aspen and willow at several locations in Bonaventure, Gaspé-Est, and Gaspé-Ouest CDs.
1975	35% defoliation on some trembling aspen in the Gaspé Conservation Park and light damage on willows at Saint-Damase and south of Les Méchins [Cherbourg].
1976	Moderate local defoliation on willows near Saint-Jean-de-Cherbourg.
1977	Low population levels on willows at Petite-Vallée.
1978	90% defoliation on a few willows west of the Matane Wildlife Reserve.
1979-1981	Traces only.
1982	30% defoliation on about a hundred trembling aspen along the Square Forks River (Matapédia).

OTHER DECIDUOUS SPECIES

Whitemarked tussock moth, *Orgyia leucostigma leucostigma* (J.E. Smith)

In general, the pockets of infestation caused by this species are rather limited and do not persist as the insect is quickly brought under control by a viral disease. This species feeds on various deciduous and coniferous trees.

Year	Remarks
1938	Found near Rimouski and in the Matapédia valley.
1947	Abundant at Baie des Chaleurs in association with the **rusty tussock moth.**
1956	Many deciduous trees and shrubs defoliated in the Port-Daniel Wildlife Reserve. Multiple collections from birches at Chandler.
1966	Presence reported on pin cherry near La Pocatière.
1970	Presence reported on speckled alder at Cap-Chat.
1974	Sampled at a few sites at La Pocatière and scattered throughout the peninsula.
1975	High-level local infestation on dogwood and eastern cottonwood near Amqui.
1976	Major upsurge in populations, the most strongly affected species being trembling aspen, dogwood, balsam poplar, and pin cherry. Moderate and severe defoliation concentrated between Lac Cascapédia (Gaspé-Ouest) and Highway 299 in the Gaspé Conservation Park. Other pockets of low-level infestation observed in Bonaventure, Matane, and Matapédia CDs.
1977	Populations low in the peninsula except near Le Gîte-du-Mont-Albert, L'Anse-à-Valleau, Sainte-Anne-des-Monts, Anse-Pleureuse, Petite-Vallée, and Grande-Cascapédia where the populations were moderate or high. North of L'Ascension-de-Patapédia, white birch were 15% defoliated over 3.8 km^2 and 40% defoliated over 0.6 km^2. The other affected species were: balsam poplar, mountain maple, willow, mountain-ash, sugar maple, alder, and yellow birch.
1978	Collapse of populations.
1980	Traces only.

OTHER DECIDUOUS SPECIES

INSECT	YEAR	HOST	REMARKS
Eastern tent caterpillar *Malacosoma americanum* (F.)	1943	CHE, PO, B.	Exceptionally abundant in Administrative Region 01 except in the Gaspé, sporadically causing moderate defoliation.
	1969	CCH, APP.	High population levels north of Mont-Carmel.
	1972	CCH, APP.	High population levels at La Pocatière.
	1973	CCH.	Moderate defoliation at La Pocatière.
Fruittree leafroller *Archips argyrospila* (Wlk.)	1980	CHE.	High population levels on some trees at Causapscal.
	1982	WI.	50% of foliage infested in a 1-ha stand near Saint-André-de-Restigouche.
Obliquebanded leafroller *Choristoneura rosaceana* (Harr.)	1964 to 1983	DEC.	Commonly sampled.
Plum webspinning sawfly *Neurotoma inconspicua* (Nort.)	1974	PCH.	Found at Cap-Chat and Port-Daniel.
	1975	PCH.	Light local defoliation at Saint-Guy.
Yellownecked caterpillar *Datana ministra* (Drury)	1967	SE.	Low-level populations east of Saint-Alexandre (Kamouraska).
	1975	APP.	10% defoliation at Saint-Damase.
	1976	SE.	15% defoliation on one tree at Pointe-à-la-Garde.

OTHER DECIDUOUS SPECIES

Partial list of other insects encountered in the region

English name	Latin name	Preferred host(s)
Canadian tiger swallowtail	*Papilio glaucus canadensis* R. & J.	TA, BPO, PCH, DEC.
Cherry leafcone caterpillar	*Caloptilia invariabilis* (Braun)	PCH, WB, AL, YB, SM, DEC.
Climbing cherry cutworm	*Crocigrapha normani* (Grt.)	SM, DEC.
Dusky leafroller	*Orthotaenia undulana* (D. & S.)	SM, TA, RM, BPO, DEC.
Elm sawfly	*Cimbex americana* Leach	WB, TA, WI, DEC.
Elm spanworm	*Ennomos subsignaria* (Hbn.)	WE, SM, WI, BHA.
Filament bearer	*Nematocampa limbata* (Haw.)	BF, WS, WB, CON, DEC.
Fringed looper	*Campaea perlata* (Gn.)	SM, WB, TL, WS, BF, DEC, CON.
Gypsy moth (adults only)	*Lymantria dispar* (L.)	DEC, CON.
Large false looper	*Zale minerea norda* (Sm.)	TA, M, DEC.
Lilac leafminer	*Gracillaria syringella* (F.)	LI.
Looper	*Melanolophia signataria* (Wlk.)	DEC, CON.
Luna moth	*Actias luna* (L.)	DEC.

OTHER DECIDUOUS SPECIES

Maple spanworm	*Ennomos magnaria* Gn.	DEC.
Noctuid moth	*Lithophane innominata* (Smith)	SM, TA, WB, WAS, DEC.
November moth	*Epirrita autumnata henshawi* (Swett)	BF, TL, WS, SM, MOM, RM, CON, DEC.
Oak-maple humped caterpillar	*Schizura ipomoeae* Dbly.	WB, SM, CCH, DEC.
Onespotted variant	*Hypagyrtis unipunctata* (Haw.)	SM, AL, DEC.
Pale green notodontid	*Gluphisia septentrionis* Wlk.	TA, BPO, AL, DEC.
Pepper-and-salt moth	*Biston betularia cognataria* (Gn.)	WB, TA, WI, DEC, MO.
Polyphemus moth	*Antheraea polyphemus polyphemus* (Cram.)	RM, WB, WI, DEC.
Rearhumped caterpillar	*Amphipyra pyramidoides* Gn.	DEC.
Saddleback looper	*Ectropis crepuscularia* (D. & S.)	BF, TL, WS, SM, TA, CON, DEC.
Speckled green fruitworm	*Orthosia hibisci* (Gn.)	DEC, CON.
Viceroy	*Basilarchia archippus* (Cram.)	PO, DEC.
White admiral	*Basilarchia a. arthemis* (Drury)	YB, DEC.
Woolly apple aphid	*Eriosoma lanigerum* (Hausm.)	WE, APP.

N.B.: Certain species are polyphagous, attacking both coniferous and deciduous trees.

OTHER DECIDUOUS SPECIES

DISEASES

Nectria canker, *Nectria galligena* Bres.

A relatively common canker on birch, this disease is occasionally found on maple and other deciduous species. In the latter case, the fungus is often found on dead parts of the bark. The typical canker produces a target-shaped swelling on the trunk from which the bark is detached leaving the central part of the wood bare.

Year	Remarks
1965	Disease visible on beech near Saint-Marc-du-Lac-Long [Les Étroits] and Packington.
1966	Some additional trees found infested in the zone inventoried in 1965.
1974	Light damage on sugar maple at Matapédia.
1976	On sugar maple, moderate infections at Mann Settlement and low-level infections at Saint-Alexis-de-Matapédia and near Saint-Damase. On red maple, damage present over 4% of trunks at Pointe-à-la-Croix [Saint-Fidèle-de-Ristigouche].
1977	Level of infection unchanged at Mann Settlement and 8% of white birch affected at Sainte-Jeanne-d'Arc.
1978	58% of yellow birch infected in the Matapédia Arboretum. At Les-Hauteurs-de-Rimouski, 6% of sugar maple stems affected. The disease was observed on red maple south of Saint-Gabriel-Lalemant [Saint-Gabriel-de-Kamouraska].

OTHER DECIDUOUS SPECIES

Powdery mildew, *Phyllactinia guttata* (Wall.: Fr.) Lèv.

This disease may be encountered on the foliage of nearly all deciduous species. It appears as a pad of light, whitish mycelium on the leaves, especially in damp periods and toward the end of the growing season. Often small black dots - the fructifications of the fungus - are visible on the leaves through the mycelium. The disease does not cause significant damage.

Year	Remarks
1975	One 4-ha center of infestation with 30% of white birch foliage affected south of Newport [Gascons-Est].
1977	High levels of infection over 1 to 2 ha affecting foliage of alternate-leaved dogwood near Matapédia and foliage of red osier at Saint-Alexis-de-Matapédia. Low-level infection on white birch southeast of Saint-Alexandre-des-Lacs.
1978	Several sites of moderate infection reported: on white birch south of Saint-Charles-Garnier (4 ha), southwest of Lac-Humqui (2 ha), and locally at Port-Daniel; on speckled alder west of Gaspé (1.6 ha). Low-level infections also observed on white birch south of Marsoui (4 ha), at Lac-au-Saumon, and Douglastown.
1979	On white birch, infection on 55% of foliage over a distance of 3 km near Lac Côté in the Rimouski Wildlife Reserve and on 25% of foliage over 5 ha at a site 58 km northwest of Grande-Cascapédia. Moderate infection observed on black ash near Saint-Guy.

OTHER DECIDUOUS SPECIES

ORGANISM	YEAR	HOST	REMARKS
Winter injury	1981	EC.	As its name indicates, this climatic phenomenon occurs in winter; it leads to drying and mortality of twigs following an abnormal thaw.
		TA.	50% reduction in the foliage in a 0.5-ha stand at Saint-Octave-de-Métis and over 10 ha south of Gaspé.
		RM.	40% of foliage missing over 3 km^2 at Kelly [Martin].
		LPO.	Moderate to severe damage locally at Saint-Georges-de-Malbaie and at Maria.

OTHER DECIDUOUS SPECIES

Partial list of other diseases
and pathogenic agents
encountered in the region

English name	Latin name	Preferred host(s)
Quince rust	*Gymnosporangium clavipes* (Cke. & Pk.) Cke. & Pk.	SE.

CONIFEROUS AND/OR DEDICUOUS SPECIES

CONIFEROUS AND/OR DECIDUOUS SPECIES

DISEASES

Acid rain

For some years, numerous symptoms of dieback have been appearing in Canadian forests. In Quebec, this phenomenon seems to particularly affect maple stands. Among the possible factors damaging these forests, atmospheric pollutants are suspected; these include acid precipitation in the form of wet deposition; dry deposition; gases such as ozone and sulfur dioxide; heavy metals; etc. All these pollutants are often included in the common term "acid rain."

In 1984, Forestry Canada, then the Canadian Forestry Service, set up a study program aimed at detecting, if possible, the damage caused by such pollution. In Quebec, there are 24 observation plots distributed in several types of stands from the region north of Montreal to the Matapédia River valley (Bonaventure). This network monitors all changes that appear in the forests, such as insect damage, tree diseases, climatic damage, and any other symptoms that could be attributed to acid rain.

The program will be pursued for several years with various observations and analyses in order to see how the studied stands evolve and possibly to demonstrate that acid rain pollution is affecting the forests.

In the Gaspé/Lower St. Lawrence Region, three study plots for this program have been established and they are inspected twice a year. They are located in the Bic Conservation Park, southwest of Albertville, and in a stand in the basin of the Patapédia River (Bonaventure). To date, we have not observed any degradation in the studied stands that could be attributed to acid rain.

CONIFEROUS AND/OR DECIDUOUS SPECIES

Animal damage: American porcupine

These animals feed off grass during the summer, but during winter, if they lack food, they climb trees, especially conifers, to eat the bark of the trunk and branches. Branches and entire crowns are occasionally killed by girdling.

Year	Remarks
1964	In a young 4-ha stand near Percé, damage was visible on 65% of balsam firs (half of which were dead or dying).
1966	Nearly 25% of stems of Norway spruce showed old damage in a 2-ha plantation at the Parke Forestry Training Center (FTC).
1968	Light damage affecting trunks of red pine and tamarack at the Parke FTC.
1970	Light damage discovered at Saint-Gabriel-Lalemant [Saint-Gabriel-de-Kamouraska] in a young plantation of Scots pine.
1973	5 to 25% of trunks of balsam fir or white spruce damaged at sites along the Grand Pabos, Malbaie, and Dartmouth rivers (Gaspé-Est) as well as near Saint-Joques and Ruisseau des Mineurs (Matane).
1974	Moderate damage on stems of balsam fir or white spruce over about 1 ha at each site at several localities adjacent to the Matapédia, Cascapédia, and Bonaventure rivers (Bonaventure).
1975	Severe damage observed on balsam fir northeast of Causapscal and moderate damage visible on white spruce at Saint-Alexandre-des-Lacs.
1976	12% of jack pine trunks affected near Saint-Alexandre-des-Lacs. Moderate damage reported on balsam fir south of Pointe-à-la-Frégate and light damage reported at L'Anse-au-Griffon. Light damage on red pine near the Macpès Forestry Training Center.
1977	About a hundred trees attacked in a Scots pine plantation at the Saint-Modeste nursery.

CONIFEROUS AND/OR DECIDUOUS SPECIES

Animal damage: meadow vole

Also known as field mice, these rodents feed off the bark at the base of the trunks of young trees during the winter when they begin to run short of food. In plantations they can girdle and kill many trees in a single season.

Year	Remarks
1970	Third consecutive year of attack in a plantation of Norway spruce northwest of Lac de l'Est (Kamouraska): 35% tree mortality.
1974	Between 7 and 48% of trunks gnawed in small plantations of red pine at Bonaventure, New Richmond, Saint-Jogues, and Métis-sur-Mer. Moderate damage discovered locally on mugho pine near Pabos.
1975	Moderate damage reported on red pine at New Richmond.
1976	20% of jack pine affected over 40 ha near Nouvelle. Mugho pine gnawed in a nursery at Cap-aux-Meules (Iles-de-la-Madeleine).

CONIFEROUS AND/OR DECIDUOUS SPECIES

Armillaria root rot, *Armillaria* spp. complex

This fungus affects the roots and then the collar of trees of all species, but particularly those weakened by a stress of some kind. Occasionally it can lead to rapid death. The foliage of severely affected conifers takes on a characteristic reddish tinge which is particularly visible in plantations. The affected deciduous trees show signs of rapid dieback without any obvious outside cause. Recently, the incidence of the disease has increased on balsam fir as a result of infestation by the **spruce budworm** and **secondary insects** attacking the trunks.

Year	Remarks
1964	The infection noted on black spruce at Sainte-Flavie.
1966	Reported on balsam fir at Dégelis [Sainte-Rose-du-Dégelis], on sugar maple at Rivière-du-Loup, and on poplar sp. at New Carlisle.
1968	Disease reported throughout Region 01, with infection ranging from trace to moderate on black ash, white birch, sugar maple, balsam fir, and jack, red, and Scots pine.
1969	Infection found on balsam fir at the Macpès Forestry Training Center and at Saint-Pacôme.
1974	At Saint-Fabien, light infections observed on red pine in a plantation.
1975	This root rot was reported in Matane, Matapédia, Rimouski, Témiscouata, and Kamouraska CDs. Up to 30% of balsam fir affected by the **spruce budworm** were attacked; part of the mortality over areas of about 2 ha was attributed to this disease.
1976	The bulk of the moderate and severe damage occurred south of Lac Témiscouata (Témiscouata) and Humqui (Matapédia) to the New Brunswick border. Balsam fir and white spruce approaching maturity were the most heavily affected hosts in natural forest. In plantations, mortality of 1 to 5% was noted on red, Scots, and jack pine, and Norway spruce, particularly in Matane and Matapédia CDs.
1977	Renewed damage following a **spruce budworm** outbreak, mainly in the areas of Lac Témiscouata and Grand Lac Squatec (Témiscouata) where the infection struck 26 to 100% of the trees. At Lac Pohénégamook (Kamouraska), 40% of balsam fir were infected. Several other pockets of infection were observed on white spruce, balsam fir, and eastern white cedar in Rimouski, Matane, and Gaspé-Est CDs.

CONIFEROUS AND/OR DECIDUOUS SPECIES

1978 Several cases of severe damage in Témiscouata CD. Moderate infection observed on balsam fir southeast of Saint-Elzéar (Témiscouata); 4 to 55% of white spruce that had suffered from **bark splitting** were affected by root rot in Rimouski and Matane CDs.

1979 Infection on 25 to 55% of balsam fir stems southeast of Saint-Elzéar (Témiscouata) and at several sites in Témiscouata CD.

1980 The infection continued to spread at Saint-Elzéar (Témiscouata), Saint-Médard, Saint-Simon, in the Matane Wildlife Reserve, and in Témiscouata CD.

1982 As a result of weakening through repeated **spruce budworm** attacks, 8% of balsam fir were infected in Forillon National Park, 6% in the Rimouski Wildlife Reserve.

1986 See the text on **Secondary insects (reddening of fir)**, page 15.

CONIFEROUS AND/OR DECIDUOUS SPECIES

Cytospora canker (needle and tip blight), *Cytospora friesii* Sacc.

This disease is relatively common on several conifers, particularly balsam fir, but is not significant.

Year	Remarks
1970	Canker present on the branches and trunks of balsam fir and Scots pine at Saint-Alexandre (Kamouraska) and Saint-Jean-de-Cherbourg (Matane).
1973	Browning visible on 5 to 25% of balsam fir needles at Lac Matane (Matane).
1974	10% of balsam fir foliage affected at Mont Jacques-Cartier, Kelly, and Saint-Alexandre.
1975	Moderate damage found north of Pointe-à-la-Croix [Mann]. More than 15% of foliage affected on regeneration at Lac de l'Est (Kamouraska). Less severe local infestations spread over Bonaventure and Gaspé-Ouest CDs. All these reports were on balsam fir.
1976	Light symptoms visible on balsam fir in Gaspé-Ouest and Matapédia CDs.
1977	In Témiscouata CD, the intensity of damage was low.

CONIFEROUS AND/OR DECIDUOUS SPECIES

Cytospora canker, *Cytospora kunsei* Sacc. (and *Cytospora* sp.)

This disease is common on spruce, producing resinosis and bark and branch mortality. The fungus produces small cankers and also mortality of stems and branches on other coniferous species and on several deciduous species. Frequently encountered on trees already subjected to a particular stress.

Year	Remarks
1961	Disease detected on dead branches of black spruce in natural regeneration at the Parke Forestry Training Center.
1970	An infection producing marked deformation of black spruce stems in the long term extending over 10 km^2 southeast of Saint-Gabriel-Lalemant [Saint-Gabriel-de-Kamouraska]. Mortality affected 2% of the trees.
1971	In the same zone described in 1970, two study plots were established. In the first, 55% of 35-year-old black spruce had at least one canker; in the second, 28% of the 70-year-old trees showed cankers that could have existed for as long as 30 years.
1974	Light damage visible on white spruce and balsam fir at Saint-Jogues and near the Petite Cascapédia Ouest River (Bonaventure).
1975	Light infection on balsam fir near Saint-Marcellin.
1976	Cankers visible on 6% of trembling aspen over 4 ha near Les-Hauteurs-de-Rimouski.
1977	Moderate damage recorded over 2 ha of black spruce northwest of Nouvelle and other low-level damage noted over 4 ha of white spruce southwest of Saint-Valérien (Rimouski).
1978	At the arboretum at Saint-Elzéar (Bonaventure), 38% of the live black alder were affected (8% were dead) out of 1 800 plants present. 10% of black spruce affected over 0.4 ha near Saint-Donat.
1979	At Douglastown, 20% of black spruce affected over 0.4 ha.
1982	Cankers found in stands of tamarack at Marcil, Saint-Omer, and northeast of Saint-Edgar [Robidoux].

CONIFEROUS AND/OR DECIDUOUS SPECIES

Frost crack

This common disease on tree trunks is characterized by deep longitudinal cracks in the bark and wood which often forms a large callus as it heals. These cracks are more common on trees exposed to sudden, wide variations in temperature during the dormant season.

Year	Remarks
1959,1963	Damage on trunks of balsam fir frequent on the slopes surrounding Mont Albert and 1965 (Gaspé-Ouest).
1974	Moderate damage in a red pine plantation near Saint-Modeste.
1975	15% of trunks of poplar sp. affected at Saint-Onésime.
1977	40% of trunks of hybrid poplar affected over 13.5 ha at Sully.
1978	40 to 80% of trunks of hybrid poplar affected on 45 000 stems at Sully.
1970	Another survey at the poplar arboretum at Sully showed symptoms on 60% of 65 000 six-year-old hybrid poplar stems.

CONIFEROUS AND/OR DECIDUOUS SPECIES

Ice storm damage

This is an unpredictable climatic phenomenon that occasionally produces very significant damage. Some species, however, withstand it better than others. Examples of situations encountered in the region are given below.

Year	Remarks
1956	In numerous stands in the eastern part of the peninsula, abundant breakage of crowns was observed on coniferous species, except in the southeastern part of Gaspé-Est CD and the northern part of the bay of Gaspé.
1960	Light to moderate damage on a strip 8 km wide between La Pocatière and Rivière-du-Loup. The most affected species were poplars, maples, white birch, and white elm.
1968	The majority of deciduous trees were severely damaged between La Pocatière and Rivière-du-Loup.
1974	Moderate to severe damage between La Pocatière and Matane. The trunks and crowns of many deciduous and resinous trees were broken.

CONIFEROUS AND/OR DECIDUOUS SPECIES

Late frost injury

This is a relatively common phenomenon that occurs late in the spring. In conifers, it causes death and browning of new, very juvenile shoots, and in deciduous trees, it causes fading and falling of leaves that are developing or are just barely developed.

Year	Remarks
1960	Sugar and mountain maple foliage severely affected near La Pocatière.
1961	Damage observed on young Norway spruce and eastern white cedar at the Parke Forestry Training Center.
1962	In one area between Causapscal and Matapédia, the majority of young trembling aspen crowns were browned.
1963	Noticeable damage on maple at several sites throughout the region. At Grande-Rivière, damage was observed on horse-chestnut.
1964	Annual shoots of balsam fir and spruce were severely damaged at several sites on the peninsula.
1965	Trembling aspen foliage affected in a large area along the York River (Gaspé-Est). Ornamental maples were also affected in several areas, though only locally.
1968	Damage throughout Region 01 on both coniferous and deciduous trees. Major damage on balsam fir and white spruce in Rimouski CD; generally light elsewhere.
1969	Noticeable damage on conifers in the La Pocatière and Mont-Joli areas.
1971	Moderate damage encountered on trembling aspen at Rivière-Bleue, on sugar maple at La Rédemption and on white birch at Saint-Gabriel-Lalemant [Saint-Gabriel-de-Kamouraska]. Low-level damage on several deciduous and resinous species between La Pocatière and Rimouski.
1972	Moderate damage observed on balsam fir and on white and Norway spruce in Kamouraska and Rimouski CDs.
1973	Light to severe damage reported in various localities in Gaspé-Est and Bonaventure CDs on balsam fir, trembling aspen, white and black spruce, and sugar maple.
1974	Severe symptoms on trembling aspen at Saint-Elzéar; 10% of two million jack pine seedlings affected at the provincial nursery at Sainte-Luce.
1975	Low-level damage on balsam fir at Saint-Jean-de-Cherbourg, Saint-Léon-le-Grand, and Bonaventure and on sugar maple at Les-Hauteurs-de-Rimouski.

CONIFEROUS AND/OR DECIDUOUS SPECIES

1976 Two clones of hybrid poplar showed severe damage on the majority of stems near Rivière-Bleue and Saint-Elzéar (Témiscouata). On balsam fir, 70% of shoots were affected over 10 ha to the east of Murdochville. Light damage was visible at L'Anse-aux-Gascons, Lac-au-Saumon, and Sainte-Marguerite. Over 4 ha at L'Anse-aux-Gascons, 60% of white spruce shoots were affected, 20% at Saint-Alexandre-des-Lacs (Matapédia).

1977 In a zone of about 1,000 km^2 in the Murdochville area, between 10 and 80% of buds of trembling aspen did not open because of a late frost. Also, 80% of white spruce shoots were affected over 4 ha in the same area. Several other cases of damage (generally light) were found on trembling aspen in Kamouraska and Témiscouata CDs, on balsam fir and trembling aspen in Gaspé-Ouest and Gaspé-Est CDs, and finally, on sugar maple in Bonaventure CD.

1978 Moderate to high damage noted in plantations near Gaspé and in natural forest north of Lac Témiscouata.

1979 40% of buds withered on balsam fir along 4 km of highway near Murdochville. Light damage observed there on white spruce and on balsam fir near Sainte-Anne-des-Monts.

1980 Less than 10% of shoots affected on balsam fir at Sainte-Françoise and Saint-Majorique.

1981 60% of foliage destroyed scattered throughout some stands of red maple near Cloridorme. About 50% of trembling aspen foliage affected over 1 ha at Saint-Valérien and at Saint-Eugène-de-Ladrière (Rimouski).

1983 White, black, and Norway spruce severely affected over 50 ha at Saint-Alexandre-des-Lacs and over 4 ha at Causapscal. Symptoms also observed on many young conifers in plantations in the Matapédia valley.

1987 Young leaves of trembling aspen affected by late frost in an area between Rivière-du-Loup and Matane.

CONIFEROUS AND/OR DECIDUOUS SPECIES

Windfall, windthrow

This is a relatively common and unpredictable climatic phenomenon. The observations given here are examples of situations encountered in the region.

Year	Remarks
1963	Many trees broken or uprooted by a small tornado that travelled the length of Témiscouata CD and Causapscal.
1967	Autumn wind damage over an area measuring 3 km x 60 m in a pole stage stand of black spruce at the Parke Forestry Training Center (FTC).
1973	Moderate to severe damage observed on balsam fir near Saint-Léon-le-Grand.
1974	Numerous cases of high levels of wind damage affecting red and black spruce, balsam fir, and trembling aspen, in areas of less than 1 ha in Témiscouata and Kamouraska CDs.
1975	Several cases of major wind damage to balsam fir: 20 ha northeast of Saint-Edgar, 2 ha at Saint-Yvon [Grand-Étang] and 2 ha near the Square Forks River (Matapédia). 16% of stems affected in a stand of eastern white cedar near Rivière-du-Loup.
1976	78% of balsam fir overturned at Saint-Louis-du-Ha!Ha!. 44% of black spruce affected in a stand at the Parke FTC. Also, between 5 and 15% of sugar maples were damaged by wind over 20 ha in the seigneury of Madawaska (Rivière-du-Loup).
1977	33 to 90% of stems of balsam fir affected at the following sites: 320 ha in the Gaspé Conservation Park, 2 ha northwest of Saint-Hubert and 0.4 ha at a site 50 km southeast of Saint-Léon-le-Grand.
1978	Wind damage over 8 ha near Dégelis and 1.3 ha at Saint-Louis-du-Ha!Ha! affecting nearly half of the balsam fir at each site.
1980	Damage to 5 ha of red spruce at the Parke FTC.
1984	46-ha fir stand affected by wind damage near Trinité-des-Monts.
1986	78 hectares of balsam fir blown down south of Lac Belle Fontaine (Rimouski), in the Rimouski Wildlife Reserve.

CONIFEROUS AND/OR DECIDUOUS SPECIES

ORGANISM	YEAR	HOST	REMARKS
Animal damage			
Beavers	1974	TA.	32% of trees affected over 0.4 ha at Sayabec.
	1975	TA.	Moderate damage over 0.4 ha at Lac des Chasseurs (Rimouski).
	1976	TL.	Mortality of about a hundred trees at Saint-Alexandre-des-Lacs due to construction of a beaver dam.
Yellow-bellied sapsucker	1966	NS.	Damage on the majority of the trees in a 2-ha plantation at the Parke FTC.
	1966	SP.	Light to moderate damage in a pole stage stand at Saint-Alexandre.
		BF.	Light damage in a stand at Sainte-Rita [Ruisseau-Noir].
	1973	YB.	Light damage at Maria [Guité].
	1974	WS.	Low damage levels near Nouvelle.
		WB.	Low damage locally at Routhierville [Milnikek] (Matapédia).
	1975	YB.	Light damage at Saint-René-de-Matane [Goupil].

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N.B. Titles of annual reports repeated over several years have been abbreviated and inserted into a single reference.

SPECIES NAMES AND CODES

English name	Latin name	Code
Coniferous (resinous) species		CON
Balsam fir	*Abies balsamea* (L.) Mill.	BF
Black spruce	*Picea mariana* (Mill.) B.S.P.	BS
Eastern white cedar	*Thuja occidentalis* L.	EWC
Eastern white pine	*Pinus strobus* L.	EWP
Jack pine	*Pinus banksiana* Lamb.	JP
Juniper	*Juniperus* sp.	J
Mugho pine	*Pinus mugo* Turra	MP
Norway spruce	*Picea abies* (L.) Karst.	NS
Pine	*Pinus* sp.	P
Red pine	*Pinus resinosa* Ait.	RP
Red spruce	*Picea rubens* Sarg.	RS
Scots pine	*Pinus sylvestris* L.	SP
Spruce	*Picea* sp.	S
Tamarack	*Larix laricina* (Du Roi) K. Koch	TL
White spruce	*Picea glauca* (Moench) Voss	WS
Deciduous species		DEC
Alder	*Alnus* sp.	AL
Apple	*Malus* sp.	APP
Balsam poplar	*Populus balsamifera* L.	BPO
Beaked hazelnut	*Corylus cornuta* Marsh.	BHA
Beech	*Fagus grandifolia* Ehrh.	BE
Birch	*Betula* sp.	B
Black ash	*Fraxinus nigra* Marsh.	BAS
Cherry	*Prunus* sp.	CHE
Choke cherry	*Prunus virginiana* L.	CCH
Eastern cottonwood	*Populus deltoides* Bartr.	ECO
Hybrid poplar	*Populus* L.	HPO
Largetooth aspen	*Populus grandidentata* Michx.	LTA
Lilac	*Syringa* sp.	LI
Lombardy poplar	*Populus nigra* var. *italica* Muenchh.	LPO
Maple	*Acer* sp.	M
Mountain-ash	*Sorbus* sp.	MO
Mountain maple	*Acer spicatum* Lam.	MOM
Pin cherry	*Prunus pensylvanica* L.f.	PCH

Plum	Prunus sp.	PL
Poplar	*Populus* sp.	PO
Red ash	*Fraxinus pennsylvanica* Marsh.	RAS
Red maple	*Acer rubrum* L.	RM
Red oak	*Quercus rubra* L.	RO
Serviceberry	*Amelanchier* sp.	SE
Striped maple	*Acer pensylvanicum* L.	STM
Sugar maple	*Acer saccharum* Marsh.	SM
Trembling aspen	*Populus tremuloides* Michx.	TA
White birch	*Betula papyrifera* Marsh.	WB
White ash	*Fraxinus americana* L.	WAS
White elm	*Ulmus americana* L.	WE
Willow	*Salix* sp.	WI
Yellow birch	*Betula alleghaniensis* Britton	YB

ALPHABETICAL LIST OF CODES

Code	English name	Code	English name
AL	Alder	MP	Mugho pine
APP	Apple	NS	Norway spruce
B	Birch	P	Pine
BAS	Black ash	PCH	Pin cherry
BE	Beech	PL	Plum
BF	Balsam fir	PO	Poplar
BHA	Beaked hazelnut	RAS	Red ash
BPO	Balsam poplar	RM	Red maple
BS	Black spruce	RO	Red oak
CCH	Choke cherry	RP	Red pine
CHE	Cherry	RS	Red spruce
CON	Coniferous (resinous) species	S	Spruce
DEC	Deciduous species	SE	Serviceberry
ECO	Eastern cottonwood	SM	Sugar maple
EWC	Eastern white cedar	SP	Scots pine
EWP	Eastern white pine	STM	Striped maple
HPO	Hybrid poplar	TA	Trembling aspen
J	Juniper	TL	Tamarack
JP	Jack pine	WAS	White ash
LI	Lilac	WB	White birch
LPO	Lombardy poplar	WE	White elm
LTA	Largetooth aspen	WI	Willow
M	Maple	WS	White spruce
MO	Mountain-ash	YB	Yellow birch
MOM	Mountain maple		

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